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Vol. XV SEPTEMBER, 1920 No. 9

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VOL. XV. SEPTEMBER, 1920 No. 9

Sanitary Measures That Help to Save the Pig Crop*

By H. B. RAFFENSPERGER, M. Ped., M. D. C., Chicago, Ill.

Bureau of Animal Industry.

WE are all agreed that something should be done to save the pig crop, but what, is a problem. Sanitation has been advocated from the public platform from time to time, and it has taken a definite form to some extent in tuberculosis eradication work and in the control of contagious abortion, but it has not taken definite form in the raising of pigs. Generally speaking, no standard of sanitation has been set up for the control of diseases of parasitic origin in pigs.

It is true that drugs have been of some service, biologics have served their purpose to some extent, but there are conditions which neither medicines nor biologics appear to help. These are the cases where sanitation will solve the problem.

In my opinion, one of the very bad practices among the farmers is the promiscuous use of the common disinfectants; in other words, attempting to disinfect a dirty hog lot or farrowing pen by merely spraying a considerable quantity of the common disinfectants over the litter. We are very sure that spraying the soil or the litter in the hog lot or the litter in the farrowing pen is not effective in destroying parasite eggs. It is true, however, that a six per cent liquor cresolis compositus, which is equivalent to three per cent cresol, directly applied to the eggs for five hours will destroy them; a five per cent carbolic acid solution acting for ten hours will also effect their destruction, but we must take into consideration the fact that we are dealing with parasite eggs that antiseptics do not readily affect, neither does freezing.

We have done some work in trying to destroy the parasite egg by low temperatures, and have exposed the eggs to low temperatures during different stages of development of the eggs as well as in the resting stage. We have placed ascarid eggs in the resting stage in a freezer for forty days at 2 to 16 degrees below zero and then defrosted them at room temperature, then placed them in a proper medium in the incubator and have found that they would develop active vermiform embryos inside the egg shell. We have also taken the females and exposed them to different climatic conditions for eighty-nine days during the winter months, the parasites being exposed to eight degrees below zero, also to snow and rain. At times the parasites were dry and at other times they were moist, and after being submitted to these weather conditions for eighty-nine days, we dissected out the eggs from the uteri and placed them in a proper medium and

*Presented at meeting of Illinois Veterinary Medical Association, Champaign, July, 1920.

cleavage took place So, you can readily see that promiscuous spraying of the hog lot or of the farrowing pen would not be efficient in destroying the eggs of these parasites.

What is called good sanitation on the farm is usually not efficient. I frequently have had this experience. Where pigs were sent in to be posted, I would get the history "sanitation good," and in nearly every instance I would expect to find about all of the parasites that are on the hog map. I have in mind especially one case where I assisted in an autopsy. These pigs came from Iowa, and the owner had not been able to raise a good herd of hogs for the past six or seven years, notwithstanding the fact that he always immunized against cholera. His herd always showed an unthrifty condition. The history of this particular herd was: "Sanitation very good." After we posted the pigs and found no lesions of cholera, we made an examination for parasites, and were able to recover from the small intestine over one hundred ascarids, varying from an inch to six inches in length. Notwithstanding the fact that the history of this herd indicated good sanitation, I ventured the assertion on that occasion that if those present would look into the past history of the herd they would find that probably five to six weeks previously the little pigs showed evidences of thumps, not doing well, some losses by death, etc. The history was looked into and just that condition was found. I believe that in all postmortems where a considerable infestation such as I have described is found, the past history, if unearthed, will indicate a condition similar to the case described.

What is our plan in our experimental work? I want to say first of all that it has not proved to be one hundred per cent effective. We have been able to accomplish something by sanitation and as Dr. Neil, inspector in charge of the Chicago station, remarked, as he looked over the field, our results were probably in proportion as our plan was carried out. On some of the farms where farmers are cooperating with us, we are having excellent results. On one farm especially we have a herd of 460 pigs that were farrowed between the first and last week of March. There are practically no runts or backward pigs in this herd. Our plan was carried out very well by this man. On other farms, our results have not been so good, but in our opinion, this was largely due to the fact that our plan was not carried out.

Our plan is as follows: First, clean all the loose litter from the farrowing pens, then thoroughly scrub them with hot water and lye or soap. The water should be at the boiling point when applied to the pens. After the farrowing pens have been thoroughly cleaned in this way, the sows may be prepared to be placed in them. About ten days before the farrowing period, each sow should be placed in a cage and the udders cleansed with warm water and soap. Our slogan is: "The first mouthful the little pigs receive should be a clean mouthful." After the little pigs are a week or two old and weather conditions are right, they should be removed to a clean pasture, having individual pens and neither the little pigs nor the sows should at any time be permitted to come back to the dirty hog lot. I am probably making a very radical statement, but it is my opinion that the small hog lot which has been used from year to year must be eliminated. It is the greatest menace to the health of the herd. I believe that the top of the ground should be scraped and the top soil hauled away and dumped where it will infest no other hogs. The old fence should be burned up, and the hog lot seeded down to grass and then forget that there ever had been such a thing on the farm. Another thing I would like to emphasize: I believe that the farrowing pens should be used for farrowing and for no other purpose. It surely is a mistake to use the farrowing pens to colonize the large hogs in or to feed them in. I believe farrowing pens are necessary where pigs are farrowed in January, February and March, and I believe we will save some little pigs by having a warm place for the sows to farrow in, but as soon as weather conditions permit, the sow and the little pigs should be placed in a clean pasture, in individual pens.

Someone has said, if we control hog cholera, we have pretty well controlled our hog diseases. No one will deny that this statement is true in reference to cholera, that serum and virus will control it, but

we all know that we have losses in little pigs even before the age that serum and virus are used, and even after serum and virus are used, and our herd is immunized, losses occur from conditions other than cholera. We cannot at this time overlook the dirty hog-lot diseases, such as the so-called bull-nose, necrotic enteritis and the necrotic sore mouths, to say nothing of parasitic invasions. We believe by sanitation, by the simple method we are using, that these conditions can be eliminated.

Obstacles Not Insurmountable

Can we clean up? Is our method a practical one? I believe that it is. It is true that some will say they have not the clean pasture, that they are not fixed to handle a pig crop in the manner indicated, but this is no barrier, for the problem of shade and water on any farm can easily be handled. We have seen very good results in supplying water to large herds of hogs by using the galvanized fountain that will hold probably one hundred to one hundred and twenty-five gallons of water. These fountains are on a sled and may be hauled to any part of the pasture. It is usually necessary to fill them once a day. This is an advantage, as the fountain may be placed at different locations in the pasture and thus prevent the hogs wallowing and rooting up the pasture where they water. As to shade, if there are no shade trees, a temporary shed may be built that will answer the purpose very well.

The question comes up, will it pay? Is our method not too expensive? I will answer that by giving my observations in the territory in which we are conducting our experiments. I have investigated losses on various farms in this particular section of the state, and this is what I have learned. I went to one man and inquired in regard to his pig crop last year. He informed me that he had sixty little pigs, but of those sixty he had been able to raise only twelve. He had used serum and virus and bacterins. I saw another man who had fifty-seven sows that farrowed over three hundred pigs, and of the three hundred pigs he lost all before any of them weighed thirty-five pounds. These pigs also had serum and virus. The question is, Does it pay to try to raise pigs in that way, where the losses are from eighty to one hundred per cent? I am sure that we could go on those farms and by the simple sanitary methods I have outlined here today, save at least eighty per cent of the pigs.

The proposition is this, Which is the better thing to do, make no effort at sanitation and lose forty to eighty per cent of the herd, or make an effort at sanitation and save practically all of the herd?

In conclusion, you will all agree, we must do more than talk sanitation from the platform. It must take on a definite form. We must be prepared to show results to meet arguments against sanitation. As to the use of bacterins, I am neither discouraging its use nor recommending its use in our experimental work. If a man who is cooperating with us, desires to use bacterin on his little pigs, very good; if

Saving the pig crop.

he does not wish to use it, I do not advise him to use it. I believe that this is the proper position for the Bureau to take, since there has not been sufficient work done on the subject to give us a positive knowledge of just what the effect of bacterin is on the little pigs. The Bureau of Animal Industry in its experimental work is trying to demonstrate what may be done along the line of sanitation. This work can be done only by the cooperation of farmers who are willing to carry out our plans. If we can go on these farms where the losses have been from sixty to one

hundred per cent and, by the simple sanitary methods indicated, prevent losses, and turn out a uniform herd, we believe that we have done something that will demonstrate to the pig industry the importance of sanitary measures. Not considering the pigs that are born dead or the cases of abortion, I believe, with the plan outlined, eighty to ninety per cent of the pig crop can be saved.

Accredited Herd Work In Illinois

By J. J. LINTNER, Chicago

ALTHOUGH tuberculosis was one of the first diseases recognized by scientists and has undoubtedly been given more study than any other disease affecting either the human race or animals, it is today the cause of the greatest loss among food-producing animals as well as responsible for a large percentage of deaths in the human family.

We know positively that healthy cattle fed upon food containing tuberculous matter of human origin become infected with the disease, and that bovine tuberculosis is communicable to man is no longer a theory.

The reasons for eradicating this disease from live stock are self-explanatory, viz., first, as a conservation measure for our food supply; second, as a social obligation to our fellow man.

We, as veterinarians, have as important a place to fill in this country as has the medical profession that cares for mankind, because we are dealing largely with problems of food for human consumption, whether it be beef or dairy products.

One of the most important steps toward the freeing of herds from tuberculosis was the establishment of the Tuberculosis Free Accredited Herd plan, which is in operation in 46 states.

The accredited herd plan is a successful one. It has proved to be of practical value to the live stock industry and popular with breeders who are familiar with it. The fact that cattle are in an accredited herd attracts buyers, and such cattle sell for 10 to 25 per cent more than other cattle of similar quality not accredited.

The work has grown faster than was anticipated. A recent summary of the work in the United States shows:

Under Supervision		Accredited	
Herds	Cattle	Herds	Cattle
25,793	537,240	2,230	60,237
Passing One Clean Test		New Herds on Waiting List	
Herds	Cattle	Herds	Cattle
15,472	258,331	4,740	115,053

This list of herds awaiting test has accumulated without stimulation on the part of those engaged in the work, simply by natural growth. What this list would comprise if there had been conducted a propaganda throughout this country to interest live stock owners and have them sign agreements, is difficult to estimate.

The fact that tuberculosis can be eradicated from herds and that herds can be kept free from the disease has made its impression upon live stock owners throughout the United States, and they are not going to be satisfied, the vast majority of them at least, to own herds of cattle the health of which they are doubtful about. They are going to eradicate tuberculosis from their herds and the Live Stock Sanitary officials and the Bureau of Animal Industry are going to be held responsible for guiding the work along proper channels.

You are aware of the opposition raised and protests made against the tuberculin tests in various sections of the country by breeders, and especially by those who suspected disease in their herds but disliked to face the facts.

Probably no line of work that has ever been inaugurated for the eradication of an infectious disease has brought about such decided changes of opinion and caused so many to assume a favorable attitude toward a movement, as has this movement to eradicate tuberculosis from live stock. In sections where opposition was at one time the greatest the request for the work is now general.

Vital Issue Confronting Breeders

The accredited herd plan is purely a business proposition. The vital issue confronting the breeder is not what will become of the herd that is accredited as free from tuberculosis, but what about the eventual sale of cattle not identified with the plan.

Some breeders have preferred to have their herds tested by their private veterinarian before placing them under supervision on the accredited herd plan, and much commendable work has been done by the practicing veterinarian. Never before has the veterinarian been requested to conduct so many tuberculin tests, and from all indications the demand for his services has just begun. With the great demand for making tuberculin tests under this plan, admitting that the present force is too small and anticipating that the combined State and Federal forces in the future will be too small, we must prepare to organize for the future.

It was proposed to Congress by the Bureau in 1917 that the counties and municipalities should bear part of the expense of eradicating tuberculosis from their live stock. From the present indications it becomes apparent that support must be obtained from these sources. It will be necessary to employ veterinarians to assist the State and Federal forces in testing herds of cattle.

In Tazewell County, Illinois, arrangements have been completed whereby the Farm Bureau is paying one-half the salary and expenses of a veterinarian assigned to tuberculosis eradication work in that county.

In Winnebago County, Iowa, the entire salary and expenses of the veterinarian engaged in this work is borne by the county.

In a certain county in Minnesota the salary and expenses of a veterinarian is borne by the county, the funds being obtained through a taxation of one-half of one per cent on all pure-bred cattle sold from herds under supervision in that county.

Various other counties are contemplating making similar arrangements to facilitate the testing of herds under this plan.

A feature of the accredited herd plan which has been largely discussed is that part of Paragraph 1 which provides that the test shall be made under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of the state in which cooperative eradication work is conducted jointly by the United States Department of Agriculture and the state. Some maintain that this plan is wrong because it does not recognize tests made by the private veterinarian.

The work that the profession has done in the control and eradication of infectious diseases of animals stands out as a monument to their ability, their qualifications, and their integrity. The Bureau of Animal Industry, which is largely composed of veterinarians, has the highest regard for the ability and the splendid cooperation of the private veterinarians of the United States. They are not recognized to test cattle for the accredited herd plan, but it is not because the overwhelming majority of them are not considered capable; it is because the state governments and the United States Department of Agriculture are called upon officially to pronounce herds of cattle free from tuberculosis and to certify that they are free, and the Bureau of Animal Industry in carrying out its functions has adhered to the plan of doing the work assigned to it by Congress with regularly employed inspectors who are under rigid discipline and who are maintained in the service because they carry out instructions implicitly. Furthermore, when this plan was formulated the members of the pure-bred breeders' committee demanded that whatever action was taken in the accredited herd work should be of an official nature and that the tests should be made by State and Bureau representatives whose tenure of office depended upon reliable work.

At the meeting of the United States Live Stock Sanitary Association held in Chicago December 3, 1919, the following amendment to the Uniform Rules and Methods of the accredited herd plan was made.

When a herd has been officially accredited continuously by the United States Department of Agriculture and State for a period of two years, it may then be tuberculin-tested annually by any veterinarian whose name is on the accredited list of veterinarians approved by the United States Bureau of Animal Industry, provided that before any veterinarian other than one who devotes his entire time to the work in any state or the Bureau of Animal Industry can be approved for accredited herd work, he shall have passed an examination conducted by the proper live stock sanitary official of the state in which he resides and the Bureau of Animal Industry. He then shall be eligible to conduct annual tuberculin tests upon herds which have been officially accredited on dates approved by the proper state live stock sanitary official and the inspector in charge of the Bureau of Animal Industry in the state wherein the herd is located.

(b) No herd test can be made by such an approved veterinarian unless he has instructions in writing from the state official to that effect. The dates for the annual tests for each herd shall be recorded in the state office and also in the office of the Inspector in Charge. On any annual retest the State and Bureau reserve the right to have a regularly employed official present on the farm to supervise the testing done by the approved veterinarian.

(c) The approved veterinarian shall conduct each test strictly in accordance with instructions issued by the Bureau of Animal Industry to employees engaged in cooperative tuberculosis eradication work. At the conclusion of each test the approved veterinarian shall submit to the State Veterinarian and the Inspector in Charge of the Bureau of Animal Industry, a copy of the record of the test.

(d) Any animal of a herd under supervision which may react in any herd tuberculin tested by an approved veterinarian shall be marked for the purpose of identification in accordance with the regulations of the state in which the animal is located.

(e) Tuberculin tests applied by veterinarians other than those regularly employed by the State and the Bureau of Animal Industry shall be paid for by the owner of the herd.

Amendment 1 of B. A. I. Order 264 pertaining to the exportation of animals authorizes all veterinarians who have been appointed by the state authorities and approved by the Bureau of Animal Industry to apply tuberculin tests to cattle intended for export to countries other than Canada.

The four copies of the certificate issued should be forwarded to the Chief Veterinarian's office, who will forward them to the Inspector in Charge of Tuberculosis Eradication work in state of origin, who will endorse all four copies and forward them to their respective destinations.

Prior to making this export test the veterinarian conducting the test should have the owner of said cattle execute the following affidavit and forward with the copies of certificate as issued.

I..... do solemnly swear that any reactors to the tuberculin test to be made of my cattle for export to..... will be immediately placed in a satisfactory quarantine and held subject to the laws and regulations of the state in which tested, and that no animal presented for the test has at any time reacted to tuberculin or received any injection of tuberculin within a period of 60 days preceding the date upon which they are offered for said tuberculin test.

(signature) .....

Subscribed and sworn to before me at.....

.....this..... day of..... 1920.

(signature) .....

Notary Public.

In addition to forwarding the four copies of certificates for endorsement together with the foregoing affidavit it is necessary that the port of embarkation be given, also if possible the name of the vessel upon which reservation is made and the date of sailing. It is imperative that this information accompany the certificate to prevent delay in handling shipments at the port.

An amendment has been made to Section 2 of Paragraph 7, B. A. I. Order 263, effective July 1, 1920, reducing the number of post temperatures from seven to six, thus reducing the period during which temperatures are taken from twenty to eighteen hours, except when cattle are destined to states requiring longer periods.

This action is based upon data gathered from practically all the states in which cooperative tuberculosis eradication work is in progress. The information includes records on 13,843 cattle which reacted to the tuberculin test, of which but fourteen reactors failed to show rise of temperature before or at the eighteenth hour after injection.

For some time the intradermic method of applying the tuberculin test has been officially recognized in Illinois and 21 other states. The list of states which have approved the intradermic method is as follows:

Georgia	Oregon
Illinois	Ohio
Iowa	Oklahoma
Kansas	South Carolina
Maine	Tennessee
Michigan	Texas
Montana	Utah
Wisconsin	Washington
Nebraska	West Virginia
Nevada	Missouri
North Carolina	Wyoming

These states have agreed to accept cattle tested by the intradermic method if conducted by a veterinarian approved by the state veterinarian at the point of origin.

I am advised that Minnesota statutes will not permit cattle to be shipped into that state when tested by the intradermic method. Cattle shipped to Minnesota must have passed a satisfactory subcutaneous tuberculin test.

Covering a period of six months we have used the intradermic as a check test against the subcutaneous method. Results have varied, depending on conditions in the herd. It is the policy of our office to apply the check test on herds before accrediting them if any infection has been found in the herd.

Results of Combination Tests

Results of a combination of the intradermic, ophthalmic and subcutaneous tests conducted upon a herd of 76 cattle which had been repeatedly tested by the subcutaneous method.

No. of cattle in herd 76
No. of cattle reacting to subcutaneous test only 6
No. of cattle reacting to intradermal test only.. 5
No. of cattle reacting to ophthalmic test only.... 1
No. of cattle reacting to intradermic and subcutaneous 6
No. of cattle reacting to intradermic and ophthalmic 1
No. of cattle reacting to all three tests..... 1

Intradermic and Subcutaneous

The intradermic was followed by the subcutaneous 72 hours after.
No. of cattle in herd..... 156
No. of cattle reacting to intradermal only..... 6
No. of cattle reacting to subcutaneous only..... 3
No. of cattle reacting to both tests..... 21

On post mortem all showed tuberculous lesions. There were three generalized cases which reacted to both intradermic and subcutaneous tests.

This herd has been repeatedly tested by the subcutaneous method.
No. of cattle in herd..... 67
No. reacting to intradermic only..... 1

This animal had passed four successful cooperative subcutaneous tests prior to this test. Animal showed tuberculous lesions of the bronchial, mediastinal, mesenteric and lungs on postmortem.

This herd has been repeatedly tested by the subcutaneous method.
No. of cattle in herd..... 66

Two reacted to the intradermic check test after passing repeated subcutaneous tests. Both showed tuberculous lesions on post mortem.

Combination of Three Tests

Herd repeatedly tested by subcutaneous method.
No. of cattle in herd..... 66
No. of cattle reacting to subcutaneous only..... 7
No. of cattle reacting to intradermic only..... 4
No. of cattle reacting to ophthalmic only..... 1
No. of cattle reacting to intradermic and subcutaneous 4

Herd of 16 cattle where infection was suspected given the intradermal and subcutaneous test. These cattle had never been injected with tuberculin.

No. of cattle given both tests 16
No. of cattle reacting to both tests..... 13
No. of cattle reacting to subcutaneous 16
No. of cattle reacting to intradermic 13

Six generalized cases on post mortem. One of the generalized cases reacting to the subcutaneous failed to respond to the intradermic.

Herd never before tested.
No. of cattle in herd..... 35
Given intradermic test..... 35
Reacted to Intradermic..... 11

Ten of the intradermic reacted to the subcutaneous test three days later. One of these intradermic reactors was a calf four months of age which was not injected with the subcutaneous method. In addition to the 10 subcutaneous reactors there were two additional reactors which failed to respond to the intradermic.

Herd never before tested.
No. of cattle in herd..... 70
No. of cattle reacting to intradermic..... 24
No. of cattle reacting to subcutaneous..... 23
No. of cattle reacting to both tests..... 19
No. reacting to intradermic but not to subcutaneous 4
No. reacting to subcutaneous but not to intradermic 4

During the past six months there have been slaughtered 645 reactors from herds on co-operative test in Illinois, of which 12 failed to show microscopic lesions on postmortem, which shows conclusively the accuracy of the test, both in application and interpretation. Much credit is due to the Meat Inspection Division which conducted the postmortem examinations on these animals in a thorough and efficient manner.

No Test Infallible

From the information available the intradermic and ophthalmic, as well as the subcutaneous tuberculin tests, are not without fault and all have their limitations, as it is a fact that some tuberculous cattle will react to one test and not to the other, while others will react to the three tests, and again we find tuberculous cattle that fail to react to any of the tuberculin tests.

Animals tested for the first time with tuberculin respond to tuberculin with a wonderful degree of accuracy, provided they are tuberculous. However, there is ample evidence on record that animals or herds in which the disease exists, acquire immunity to the subcutaneous tests, either by the natural order of events or by the frequent application of tuberculin. Herds which have been repeatedly tested or in which infection is suspected should be given the intradermic test, followed 72 or 96 hours later by the subcutaneous test or preferably by a combination of the three tests.

According to all reliable information available and from observations and experiments conducted, the subcutaneous tuberculin test under normal conditions, either alone or in combination, will eliminate a higher per cent of tuberculosis from cattle than any other test.

In applying the subcutaneous test a careful physical examination is of greatest importance. If any conditions prevail which cause abnormal temperatures or tend to make the animal unfit for this test, defer the test until conditions can be remedied, thus avoiding for yourself and your state sanitary officer much embarrassment and annoyance by being unable to make intelligent interpretations of the test.

"Once a Reactor Always a Reactor"

"Once a reactor always a reactor". Any animal which has once reacted to the tuberculin test must be considered tuberculous and dangerous to the other members of the herd. It is a recognized fact that an animal which reacts to tuberculin may fail to respond to subsequent tests. Many disastrous results have been caused

by retesting a reactor, which fails to respond, and placing such an animal back in the herd. The Bureau recently conducted retests on 391 known reactors which were consigned for slaughter, and of these 118 failed to respond, of these 38 were found to be generalized cases on postmortem. During May, 1920, I was requested to conduct a test in another state on some cattle purchased by a breeder whose herd is under supervision in Illinois. After the test was completed there was practically nothing to ship. The history shows that this herd was tested two years prior to this time, two reactors being found at this test. The owner protested and was granted a retest by the state officials. Both animals passed the retest and were placed back in the herd of healthy cattle. No cattle were added to this herd in the meantime, nor have other cattle associated with the herd. The owner further informed me that one of the reactors to my test was one of the animals which reacted two years ago. The other animal which reacted two years ago was not included in my test. Through this move of false security of placing back into the herd these two cattle which reacted two years ago and which failed to respond on retest, an entire herd of pure-bred registered cattle were infected, entailing a great financial loss. Practices of this sort are expensive, and those who engage in them are certain to come to the eventual realization of the folly of such procedure. The economical way is to clean house properly and abide by the decision of the test.

The success of tuberculosis eradication depends to a marked degree upon the proper disposition of reactors, which should be quarantined, tagged and conspicuously branded, so as to identify them in their class. This is one of the greatest means of protection offered breeders who are interested in having herds of clean cattle.

We need your cooperation in this campaign so that the expression, "Bred in America", and especially in Illinois, will not only mean the best of breeding, conformation and individuality, but also freedom from disease.

Tapeworms In Chickens*

ARTHUR D. GOLDHAFT, V. M. D., Vineland, N. J.

THIS subject has been brought to the author's attention recently, first by an outbreak of tapeworm disease in Vineland, and second, on account of the economic importance of the poultry industry.

Tapeworm disease in chickens has received very little attention from veterinarians and poultry pathologists, and yet it is known that when these outbreaks do occur, egg production is reduced to a minimum, losses are very high, and in many instances the poultryman is obliged to give up the business, or start all over again.

Before considering the probable factors which are responsible for tapeworm disease in chickens, the intermediary hosts, symptoms, postmortem lesions, treatment, disinfection, etc., I think it is quite proper, in fact, essential, to first say a few words in reference to the poultry industry. The growth and development of this necessary and important industry is phenomenal and without an equal. Where previously there were thousands of acres of unused land, we now have successful poultry ranches. The splitting up of large ranches into small farms is mainly due to the growth of the poultry industry. A new avenue of livelihood has been opened for thousands of men and women, who are not only engaged in a healthful occupation, but are also helping to increase the production of eggs, so essential in the human diet, and in the treatment of many diseases.

At present, the poultry industry of the United States is dependent entirely upon the experiment stations and the various agricultural colleges, for the treatment and elimination of poultry diseases. The progress of animal industry in this country is dependent upon the interest taken by the local veterinarian, and the same should apply to the poultry industry.

So far as I can learn, the men engaged in the investigation of poultry diseases at the experiment stations and agricultural

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colleges, are mostly agricultural graduates, and not veterinarians. With all due respect to the agricultural colleges and experiment stations for their good and timely advice in the assistance and development of agriculture in the United States, I cannot but feel that the men in charge of so important a problem should be trained and experienced veterinarians.

Poultry Practice Affords New Source of Income

With the growth of the poultry industry, a new source of income has been opened to the veterinarian, and as this industry continues to grow, which no doubt it will, our incomes will increase proportionately. Some of the leading professors of poultry husbandry are very anxious to see the veterinarian give this important problem more of his time and attention. The following is an extract from a letter from an agricultural college in answer to an inquiry from case "A": "Indeed, I wish more veterinarians would take an interest in poultry pathology, because as birds get more valuable we can't afford to lose them, and it seems to me to be a line of work in which they should have a vital interest."

Vineland, N. J., is one of the leading poultry centers of the United States. Here is staged the International Egg-Laying and Breeding Contest, in which are entered many valuable birds of national fame. This contest is now in its fourth year and has achieved nation-wide fame.

During the outbreak of tapeworm disease in Vineland, and with no known effective measure to control it, the breeders were at a loss where to begin. Usually, when an outbreak of any nature affecting a large number of birds occurs, there is bound to be more or less secrecy and the breeders are not very keen for publicity. On account of this, an ordinary disease or condition becomes aggravated and the application of remedial measures are handicapped, the disease more difficult to control and elimination sometimes impossible.

One of the most prominent poultry breeders of this section, who is also one of the leaders in the International Egg-Laying and Breeding Contest, a man of keen observation and intelligence, decided to determine the causes, and a remedy, if possible for his losses. He made known his condition to the Vineland Poultry Association, and immediately after the meeting I offered my services to him gratis.

Next day, in going through the poultry houses I found seven hundred pullets. and two hundred yearlings affected with tapeworm disease, and I gazed upon them very sadly and sympathetically. A hopeless case of cerebrospinal meningitis in a horse, or a lacerated prolapsed uterus in a cow of forty-eight hours' duration is no comparison to nine hundred dejected, spiritless and sick chickens. Of course, I have reference to the feathered kind.

Case A. History. One lot of birds hatched March 1, 1919, began to lay at the age of four months, and layed heavily for a period of two months. At this time, a light but steady moult was noticed, which lasted three months or more. Another lot of birds hatched April 25, developed nicely until the latter part of August, at which time it was noticed that the sexual development of this particular lot of birds seemed arrested, and their growth very much retarded. The arrested sexual development was manifested by stoppage of growth of comb and wattle, and no change in plumage. This lot of birds was much slower in beginning to lay, and through the fall, the egg yield was very small. About the middle of November, a good many birds became emaciated. so-called "going light," and some of the birds seemed to be affected in the locomotory apparatus. They were unsteady, shaky, and lame. This condition became aggravated in a short time, and the birds began to die.

The first hatch, after a long and steady moult, yielded only a little over half of the normal egg production, but very few birds died. Some of the birds discharged yellow-brownish, slimy droppings, while others discharged droppings of a thin, watery nature. This was undoubtedly caused by the development of an intestinal catarrh, due to the presence of tapeworms. The appetite of these birds did not seem to be disturbed at first, but later on they became dull, listless, standing around and not noticing surroundings, refusing to eat, and became partially blind.

Postmortem and Diagnosis

The tapeworms were found in the droppings, and also on postmortem. If the birds are infested with these parasites, it can very readily be detected in the alimentary canal on postmortem. Some birds show all the clinical symptoms of tapeworm disease, but it is difficult to find the parasite. Invariably, if the bird harbors the parasite in small numbers, it can be found between the gizzard and the deep duodenal. Begin in the region of the deep duodenal, and slit open the intestine toward the gizzard. Wash the intestines very gently in a basin of water, and look for parasites The use of a small magnifying glass is very helpful. By all means, do not wash the intestines with a strong stream of water, as you are very apt to wash away the parasites. A catarrhal mucus, brownish in color, punctiform hemorrhagic areas, about one-quarter of an inch in diameter, and nodules were found.

One species of the tapeworm (*Davainea tetragona*) causes a nodular disease of chickens which may be mistaken for tuberculosis. Moore says "Tuberculosis is the only known disease for which this affection is liable to be mistaken, and it is of much importance that the two diseases should not be confounded. The diagnosis has not in my experience been difficult, as in every case the attached tapeworms were readily detected upon a close examination of the intestinal contests, or of the mucous membranes of the infected portion of the intestine. However, the worms are quite small and could be easily overlooked in a hurried or cursory examination. In case of doubt, if the infected intestine is opened and the mucous surface washed carefully in a gentle stream of water, the small worms will be observed hanging to the mucous membrane. This discovery, in the absence of lesions in the liver or other organs would warrant the diagnosis of tapeworm disease."

Many Species of Tapeworms

According to Stiles, there were up to 1896, thirty-three species of tapeworm recorded for poultry. The Taenia infundibuliformis and the Davainea tetragona were the two found affecting the birds that were under treatment. The intermediary hosts are probably flies, butterflies, bugs, worms, rainworms and snails.

Definitions.—Tapeworms are band-like colonies of hermaphroditic individuals arranged in adhering segments.

Predisposing causes.—In years of excessive rainfall, due to the accessibility to a great number of rainworms and flies which breed more heavily, the pullets are more liable to be infested with the tapeworm. Buying birds which are infested with this parasite, is another means of introducing it into the flock. Droppings of yearling birds which are infested with tapeworms, but show no clinical symptoms, may infest pullets. Hen manure from infested birds used as a fertilizer will invariably develop tapeworms in pullets. Crows and birds may also be considered a factor in the spreading of tapeworm disease.

Treatment.—The chief drugs used for tapeworms in fowls are: arecanut, fifteen to forty-five grains per bird; extract of male fern, thirty grains to one dram per bird; or of turpentine, one to three drams per bird, powdered kamala, pumpkin seed, tobacco, thymol, pomegranate root bark and epsom salt.

Case A. On this ranch we had seven hundred pullets and two hundred yearlings. The very sick were isolated, and the remainder of the birds divided into four lots. These birds had access to water as usual, the night before treatment. but no feed. Two hours before sunset on the following day, Lot No. 1 were given a decoction of pumpkin seed in a dry mash, making it moist. Lot No. 2 received fifteen grains of arecanut per bird in a moist mash. Lot No. 3 received thymol, one grain per bird in a moist mash. Lot No. 4 received the tobacco treatment, which was prepared as follows: One pound of ground tobacco stems was stewed in water for two hours, and the resulting liquid and residue mixed with a dry mash. All the birds of the four lots were given one pound of epsom salt to one hundred birds, in dry mash one hour later.

Results. This was determined by noting the general condition of all the birds, the percentage of eggs laid, and the postmortems of three birds from each lot. The decoction of pumpkin seeds proved

valueless; areca nut not very beneficial; thymol fair; the tobacco stems, probably produced the best results. The treatment of these four lots was repeated in one week, as follows: The birds were prepared as above, and lot No. 1 was given thirty grains of areca nut in a moist mash. Lot No. 2 received thymol two grains per bird. Lot No. 3 received the tobacco treatment as outlined above. These three lots received one pound of epsom salt to each one hundred birds, in the drinking water, one hour after treatment. Results: Areca nut, slight improvement over first treatment; tobacco, very good results; thymol, slightly more effective than tobacco, and taken more readily. The tobacco and thymol treatments caused a general improvement in the condition of the birds, and while there was a decrease in the egg yield for three or four days following the treatment, this was followed by a rapid increase in yield much in advance of that before treatment. The thymol may be purchased from any drug house and easily mixed with a dry mash, but the tobacco is difficult to obtain, requires stewing, and birds, though starved, eat it reluctantly. Before any of these birds showed any symptoms of this infestation, the egg yield was close to sixty per cent, and before treatment was begun, it was as low as fifteen per cent. The number of birds that died before treatment was given was 240; approximate loss in birds and decreased egg yield, $1,500.

Case B. These fowls received no treatment at first, but later on a few homemade remedies were given, but the loss was exceedingly high, very much greater than in case A.

Cases C and D. The birds of these two cases showed all the symptoms of tapeworm disease, especially the so-called "going light," but no birds died. The tobacco treatment as outlined above was administered, and the birds were prepared in the same manner. Results, very good. Egg production increased immediately, condition of the birds improved, and increased weight was noticed.

Case E. This case was the most interesting, and the quickest and best results were obtained. There were seven hundred birds on this ranch, and two or three weeks before the birds began to die they showed all the symptoms of tapeworm disease. Egg production was decreased from sixty to twenty per cent. Slimy and bloody droppings were found, and birds were very emaciated. Four birds died before I was called, and two died the same morning on which I was called. These two birds were posted immediately and numerous tapeworms and round worms found. Punctiform hemorrhagic areas were found in great numbers. Catarrhal exudate was present, and tapeworms and round worms easily demonstrated to the owner. These birds were prepared as outlined above, and two grains of thymol was given to each bird in a moist mash, followed in one hour by one pound of epsom salt in water to every one hundred birds. In twenty-four hours all of these birds registered improvement, and continued to improve for one week. While the egg yield was not materially increased, the general condition of these birds was very much improved and easily noticed. At the expiration of one week the same treatment was repeated with excellent results. Of all the treatments outlined above, it seems as though the thymol and tobacco treatments are the most beneficial.

Infestation of Young Pullets Serious

If pullets are heavily infested with tapeworms before the first molt, the results of this infestation are serious. If after the first molt, this pest does not appear to cause any serious disturbances, the condition of the birds remains good, there is no change in the egg yield, no symptoms of tapeworm disease are present, and no deaths. Many poultrymen and poultry pathologists are of the opinion that yearling birds may be infested with tapeworms in small numbers with no bad effects. On the surface, this statement appears to be true. I have posted many yearling birds in excellent condition with good egg-laying records, and found many tapeworms. As a sanitary precaution, and as a means of preventing the spread of this parasite to pullets and chicks, the yearlings which are infested with tapeworms should be isolated from the other birds. From an economic standpoint, more food is necessary for these yearlings to continue their egg-laying and maintain health, as these parasites are existing at the expense of the host. At the first sign of a break in the host

due to other influences this parasite will begin operations. Hutyra and Marek say, "the morbid effect of Taenia is due to a withdrawal of nutritive material, also to their poisons (Linstow); serious disturbances of health are observed only in the presence of numerous tapeworms.

Parasitic worms in the intestinal tract produce disease in a variety of ways. Contact with the mucosa, adhesion to it, boring into it, produce an irritation, which, according to the number of worms, may cause a circumscribed or a diffuse catarrh or even intense inflammation. Worms armed with hooks may penetrate more deeply into the mucosa. They may even perforate the intestinal wall and cause fatal peritonitis. Great numbers of larger worms may unite in lumps and may narrow or obstruct the intestinal lumen."

Friedberger and Frohner, speaking of animal parasites in the intestinal canal, say, "we may consider the following symptoms created by them as most important:

"1. Badly nourished condition (anemia and cachexia).

"2. Intestinal catarrh and hemorrhage of the bowels.

"3. Stoppage as well as symptoms of colic.

"4. Symptoms of brain irritation."

Sequela

The birds that recovered manifested an apparently lower vitality. Egg production was lowered and the birds did not recover full strength. They were more susceptible to colds and discharges from the nasal passages. There were earlier molts and more broodies. This may also possibly have been due to re-infection or to the fact that all worms were not entirely removed. Lowered egg production and earlier molts were also observed this spring on poultry ranches where tapeworm disease was not present. Artificial lighting of laying houses last winter is one of the contributing causes advanced by many of the poultrymen for this condition.

Prevention

If we could entirely eliminate the intermediary host this problem would indeed be a very simple one, but since it is almost impossible to accomplish this, the following suggestions, if strictly adhered to, will give the most beneficial results.

1. All birds that die from any condition or disease should first be posted and then burned. Dead chickens that are not burned or buried but thrown out on the field, are eaten by birds and crows, and provide a good breeding place for flies and worms. Birds, crows and flies play an important role in tapeworm disease. In reference to postmortem examinations in chickens, the commercial poultry plants will gladly pay the necessary fee for a painstaking, careful and intelligent post; and right here let me inform you that I would rather post ten chickens or more, than one horse or cow. The chickens can be posted at your office or at the poultry ranch, protected from storms or rain in winter, and the beastly flies and mosquitoes in the summer, while the postmortem of a horse or cow must be done at a reducing plant or in the field.

2. Flies, butterflies, bugs, worms, rainworms and snails are very plentiful during heavy rainfalls, also early in the morning. Liming of ground makes it alkaline, decreasing the number of angleworms. Baby chicks should be kept in the houses early in the morning to prevent them from eating the intermediary hosts.

3. Waterfowl should be kept away from infected water and an attempt should be made to destroy the intermediary host.

4. Portable colony houses. Drain the ranch into three lots, and move the colony house on the first lot, and alternate every year. Crop the two unused lots two years. The eggs will probably die in two years and this may help to eliminate the parasite.

5. Clean the dropping boards three times a week, and cover well so that flies cannot breed.

6. Droppings of all sick birds should be collected daily and burned.

7. In treating chickens with tapeworm disease give medicine in mash two hours before sunset. Chickens will go to roost and most of the droppings will be found on the dropping boards instead of on the ground. Clean the dropping boards at dawn the next morning.

8. Sell the chicken manure, and in its place use commercial fertilizer if necessary.

9. From the above it can be seen that the dangerous age for the infestation of tapeworm disease is before the first molt in pullets. In other words, if we can prevent the pullets eating the intermediary host, whatever it may be, before their first molt, we may to a great extent eliminate the serious consequences of this disease. This last statement appears to me to be the most vital in fighting this disease.

Disinfection. It is almost impossible to thoroughly disinfect a poultry ranch where tapeworm disease exists. However, the following may be attempted. Plow, cultivate, or scratch rough with a rake, the ground, and saturate the ground with the following mixture: One ounce of corrosive sublimate to eight gallons of water. Or unslacked lime may be used, to which may be added a five per cent solution of any good disinfectant. The houses should be sprayed with quicklime or corrosive sublimate mixture. The floors and roosts should be sprayed also, and all utensils sterilized.

Swine Diseases of Dietetic Origin

By B. J. KILLHAM, Adrian, Michigan.

IT is not the intention in this brief article to attempt to enumerate all the diseases which might be included under this head, but rather to view from a practical standpoint those diseases of dietetic origin most commonly encountered. No opportunity has been had to work in conjunction with a laboratory. The conclusions reached are the results of field observations and may be faulty. Criticism is invited.

Deficiency Diseases

It has frequently been observed that sows with suckling pigs about six weeks of age show an indisposition followed by incoordination of the hind limbs and later paraplegia. Careful inquiry has failed to reveal any cause for this other than a possible deficiency in the diet. The undermining influence of nursing a bunch of hungry pigs no doubt is the most prominent predisposing factor. The sanitary condition of the surroundings and the opportunities for exercise are beyond criticism in many cases. While many of the affected sows were fed largely on whole or ground oats, others were supplied with feeds that should contain all the elements necessary to maintenance and growth. Frequently a number of these cases are found within a small radius, which would seem to indicate that some vital element was lacking in the soils of certain sections. No lesions of consequence have been noted on postmortem; in fact, most of the sows make a good recovery if the pigs are weaned and the sows carefully handled. The supplying of charcoal, wood ashes, lime, etc., has been advised, in addition to any changes of feed thought necessary, but whether or not the beneficial results have been due to such minerals is problematical.

Paraplegia in Shoats

Paraplegia has been most frequently noted in fattening shoats, but the condition has been observed in the pigs of one litter. A number of sows each with a litter of pigs may be all running together on a farm, housed and fed the same, except for the milk derived from the sow, and yet some or all of the members of one litter will show an incoordination and later a paraplegia. The mother of the affected pigs appears normal, and may have had other litters of pigs that were apparently normal. Is it an hereditary trouble or a deficiency disease? Is it not more than probable that the sow's milk for some reason is lacking in some vital essentials?

Probably most practitioners have at some time encountered paraplegia or rachitis in well cared for shoats. In most of such conditions the underlying causes are easily discerned. Often the shoats are closely confined, allowed little or no exercise, and the choice of feed has been poor. The sole diet is often corn and water or some such unbalanced ration. Oftentimes rachitis and paraplegia are seen in the same herd, and again paraplegia may be unaccompanied by other conditions except sequelae. The paraplegia in many cases is in all probability the result of a polyneuritis, owing to the lack of vitamines or some

other essential. With rachitis we are told the alterations in the bone are due to a lack of, or an inability to assimilate, some of the necessary bone minerals. We note enlargements and alterations in the long bones. Could it not be possible that some such changes occur in the vertebrae and the resulting pressure on the cord cause paraplegia? Paraplegia is usually observed in herds where rachitis is present.

Paraplegia in shoats, in our experience, when advanced cannot be corrected. The affected animals eat well, and continue to do so even after it is necessary to lend assistance. The problem can be solved with relation to the entire herd if the diet is corrected and exercise allowed, but as before stated no great success has been attained in treatment of advanced cases; this in spite of corrections in diet and handling, and local treatment varying from liniments to actual cautery. Slaughter is often advised in the earlier stages, but this would not be desirable after the condition had obtained long enough to permit complications to become established.

Unbalanced Rations and Radical Changes in Feed.

A rather peculiar condition was encountered in one instance with relation to alfalfa feeding. It was in the spring of the year, and following a prolonged dry spell had come several good rains. The alfalfa was growing rapidly and luxuriantly. A bunch of thrifty fall pigs was turned into it for the first time about noon immediately after having been fed some ear corn. In the evening when the shoats were being driven out of the pasture two were found dead. Another died on the feeding floor while eating corn. The symptoms as described were of an apoplectic nature. A fourth died during the night. Autopsies were held on the four carcasses the following morning, but aside from some cerebral congestion no macroscopic lesions were found. The stomach of each, however, was found to be filled to its utmost capacity. A small amount of corn was packed against the pyloric orifice and the remainder of the stomach was filled with alfalfa. We worked on the assumption that the shoats had been turned into the alfalfa before the corn had become sufficiently digested to permit its passing through the pyloric orifice, and the stomach was rapidly filled with alfalfa. The corn prevented the passage of the alfalfa into the intestine and distention of the vascular stomach walls caused an excess of blood in the central nervous system, and apoplexy followed. It would seem that emesis should have occurred, but it evidently had not in the shoats that succumbed.

Laminitis

Considerable trouble has been met with at times from laminitis occurring following the abrupt turning of hogs into rapidly growing alfalfa. An occasional hog dies but most cases recover, and the trouble disappears if the hog's time in the alfalfa is limited until the digestive organs have become adjusted to the new feed. Just why laminitis should occur in one herd and not in another handled in the same manner, is problematic.

We are all more or less familiar with disturbances following the abrupt change to new corn, laminitis very frequently resulting. The same principles are involved here as in other radical changes of feed. The digestive juices and organs have been prepared to care for certain types of feed. A sudden radical change is made. As a result, the digestive apparatus being unprepared to care for the new feed, the normal controlled decomposition, known as digestion, is replaced by disorder. Toxic materials are formed and liberated, and various ills result. Small wonder that in years past new corn was held to be the cause of cholera. It, or rather the manner in which it is fed, is often a very prominent predisposing factor. A little common sense exercised in making a change of feed will prevent a vast amount of trouble and loss.

Losses Follow Abrupt Weaning

Losses ranging as high as those from cholera have been observed among pigs rather abruptly weaned and then, likewise abruptly, turned into green forage. Losses exceeding ninety per cent have been noted, and in very few other conditions do deaths occur as rapidly. The affected animals show little evidence of any great pain. Many die lying on the belly and appear to be sleeping. The chief change noted on autopsy is the collection of a clear gelatinous exudate in the abdominal cavity, principally in the regions of the kidneys

and bladder. Medicinal agents have not been of any great value, as the deaths occur too rapidly. If the animals are removed from the offending forage until better prepared to digest and assimilate it, the trouble will disappear, but often great losses occur before the correction is made.

A condition which appears to cause a muscular soreness in hogs is apparently the result of faulty feeding. At least a correction of the feed and methods of feeding brings relief. The afflicted hogs give evidence of great pain. Advanced stages are characterized by inability or unwillingness to walk. Efforts to touch the body, particularly the limbs, cause the animal to squeal frantically. This condition has been most frequently observed where an excess of proteid feed, such as beans, was being fed. Insufficient exercise with this condition, as with others, especially those due to feed excesses, is a contributing factor of prime importance.

Troubles of digestive origin are frequently met with in young pigs which are over-fat and under-exercised. These attacks are characterized by convulsions when excitement is produced, particularly at feeding time. A good clean out and the removal of the causative factors usually bring about the desired result.

Doubtless all practitioners having any hog practice have encountered such dietetic troubles as "thumps" and "scours", and are familiar with the remedial measures.

Some of the conditions mentioned, especially those due to excesses or radical changes of feed, are accompanied by elevations of temperature. Not infrequently temperatures of 160° are observed, and sometimes as high as 107°. This fact makes the differentiation between diseases of dietetic origin and those of an infectious nature difficult at times; but careful inquiries into the history and environment, coupled with painstaking observations, will usually lead to a correct diagnosis.

No attempt has been made by the writer to deal with the medicinal agents which might be of value in the ailments enumerated. Such agents usually are secondary to prophylactic or corrective measures, but oftentimes are valuable when used with due regard to the conditions present.

Anthelmintics and Insecticides

By M. C. HALL, Washington, D. C.

THE treatment of parasitic diseases of animals involves the use of two sorts of therapeutic agents, anthelmintics and insecticides. Of these, anthelmintics, as the name indicates, are used against worm parasites, located within the body of the host, while insecticides are used against insects, in the broad sense of the word, usually located on the body of the host, but occasionally located in wounds, cavities of the body, or even in the digestive tract. In addition to insects, mites and other members of the groups closely related to the insects proper are controlled by the use of insecticides, as well as by prophylactic measures. The use of the word insecticides to cover substances for use against mites and similar animals is not only the common usage among veterinarians and entomologists, but is the established usage of the U. S. Insecticide and Fungicide Board, sustained by ruling of district courts of the United States. Where an insecticide is used against insects or related forms in the digestive tract, as in the case where they are used against bots in the horse, the substances used are insecticidal in nature, but are administered in accordance with the general rules for the administration of anthelmintics and may be anthelmintic as well as insecticidal.

A large amount of common practice in the use of anthelmintics and insecticides in the control of parasitic diseases of animals is based only on clinical experience; the use of a given anthelmintic is commonly found to bring away worms or the application of an insecticide seems on casual examination to have alleviated the trouble, at least temporarily. Little consideration is commonly given as to the number of worms that may remain after the administration of an anthelmintic, and insecticidal applications sometimes receive little consideration with reference to possible lack of effect on the egg or nit stages.

Advance Through Experimental Findings

On the other hand, there is available a fairly large amount of information based on experimental investigations with reference to the actual efficacy of anthelmintics and insecticides. Such experimental demonstrations of anthelmintic efficacy are of rather recent date and much remains to be done along this line. Our knowledge of insecticidal action is rather larger, but still leaves much to be learned, and there is a large amount of necessary and useful knowledge in regard to the bionomics of insects that must yet be ascertained in order to enable us to use insecticides effectively. Any real advance in our knowledge of anthelmintics and insecticides will probably come through experimental findings; clinical observations are usually less accurate and dependable, though necessary to ascertain incidental effects on host animals.

One of the methods of ascertaining the efficacy of anthelmintics which has been used by zoologists and physicians, namely, the examination of the feces for eggs, wherever this method may be applied, is an improvement on mere clinical observation dealing with improvement in the condition of the patient, but it is limited in value by certain circumstances. Worms may be too immature to produce eggs, or may be males, or may be too few to produce enough eggs to make detection certain by the methods used, and, moreover, egg production is often inhibited over considerable periods of time after the administration of anthelmintics. More exact methods, followed by postmortem examination, were used by European workers in finding treatments for liver fluke disease of sheep.

The method used by Hall and Foster in their work in this country consisted in administering anthelmintics in varied doses under varying conditions to experiment animals, examining the feces carefully each day thereafter for at least four days, and then killing the animals and ascertaining the number of worms present. In this way, the total number of worms passed and present postmortem gave a basis on which to calculate the percentage efficacy of the anthelmintic employed and the dosage and method used. Work along this line has added considerably to our knowledge of the relative and actual values of anthelmintics, as well as the indications and contraindications for their use. In this study, experiments in vitro, ascertaining the effect of anthelmintics on worms from the host, have had but limited value. Too many other factors enter into anthelmintic action to make such findings easily applicable.

On the other hand, insecticidal values are most readily ascertained by experiments in vitro, and as the application of insecticides to insects is usually as direct in actual practice as it is in vitro, the findings are of immediate application, with due allowance for the action of the insecticide on the host animals, such as irritation, depilatory effects, etc. Not only is the insecticidal effect ascertained by direct or indirect exposure of insects to various insecticides, in vitro, but the bionomics of the insects are largely capable of being studied in vitro to an extent which is not at all true of the worm groups. In the case of bots, experiments in vitro have only limited application, owing to the factors of absorption of the insecticide and the time it remains in the stomach.

Ill-Founded Beliefs Many

In the absence of adequate experimental evidence, there has accumulated a large amount of misinformation and ill-founded beliefs regarding anthelmintics and to this has been added a number of beliefs that are unrelated to experimental knowledge or the lack of it. To briefly mention a few of these beliefs: There is a common belief that santonin is the best remedy for ascarids and that it may be given with entire satisfaction for this purpose in single doses; experiment indicates that even in very large doses, santonin falls far short of 100 per cent efficacy, and that it should be given in smaller doses and a number of doses given in order to get the best results. The statement is often published that fasting an animal for a few hours or a day or so makes the worms hungry, so that when the host animal is given an anthelmintic, especially if given in a palatable vehicle, such as milk, the worms will eagerly ingest the anthelmintic; experiments show that worms can be kept alive for weeks in physiological saline solution, or some modification of this, such as Kronecker's, where the solution is slightly alkaline, and investigations show that the food of most worms

(*Continued on Page* 439)

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The Horse as a Farm Motor

THE census of 1910 revealed that 12 per cent of the total number of horses and mules in the country were kept in the cities and 88 per cent on the farms. Statistics on this matter from the recent census are not available, but owing to the large number of horses that have been replaced in the cities by motor vehicles, it is probable that the urban horses do not exceed ten per cent, and possibly not more than nine per cent of the total number at this time.

When the country is fully saturated with farm tractors, the percentage of farm horses supplanted by the farm tractor will not exceed six per cent of the total number of horses on the farm, and may not exceed three per cent. The higher estimate is based on the probability of small tractors of a size and type not now practical, being developed.

The types of farm tractors now in use cannot be economically employed on farms of less than 200 cultivated acres. On the smaller farms, on which they can be economically used, such tractors replace twenty per cent of the horses, and on large farms, those exceeding 800 cultivated acres, tractors may economically replace as high as thirty-three and one-third per cent of the horses needed to do the farm work.

The kind of farming has an important bearing on the economy with which horses may be used for motive power. The number of horses needed on a farm is determined by the number required to do the work during the season when the greatest amount of work is to be done. This "peak load" in grain farming occurs in May or June, and falls to a very low figure during August and September, rises considerably during the months of fall plowing and corn husking and almost disappears during January and February, rising abruptly in March and in April, reaching about three-fourths of the height attained in May and June. Under such a system of farming there are too many idle days for the farm horses.

The cost of feed is the principal expense entailed in keeping horses on the farm, 72 per cent of the total cost of keeping the horse. The more even the distribution of work throughout the year, the fewer horses will be required to do it, and the greater the saving in feed.

By a system of rotation in farm crops, fortunately the system that contributes most to maintaining the fertility of the soil, the amount of work can be so distributed as to very considerably reduce the number of idle days for the horses on the farm, and thus reduce the number of horses necessary to do the farm work and effect a large saving in the cost of feed. By combining live stock raising and feeding with a judicious system of crop rotation, the idle days for the horses on the farm can be still further materially reduced, since this will bring considerable employment for them during the

winter months when they would otherwise be idle.

Under such a system of farming, tractors can compete with the horse as an economic farm motor to only a very limited degree.

Less than one-fourth of the United States produces any surplus of horses. A considerable portion of it produces only enough horses for its own use. One-third of the country offers a market for farm horses. In the section of the country that produces a surplus of horses, Illinois, Iowa, Missouri, Indiana, Minnesota, Nebraska and portions of states adjoining, the farmer can shift perhaps three-fourths of his depreciation in work horses to the cities or to other states. On farms in that portion of the country producing only enough horses for their own use, probably less than half of the depreciation may be shifted to the cities. That is, horses may be used on the farm while young, and sold for city use before their value has greatly depreciated. In sections of the country in which an insufficient number of horses are produced, to supply the requirements of the farms a much smaller part of the depreciation can be shifted to the cities. Taking the farmers of the country as a whole they must shoulder 75 to 80 per cent of the depreciation in the horses used on the farm. The depreciation on tractors cannot be shifted to others in any section of the country.

The University of Illinois has, for six years, kept an accurate record on a large number of farms showing the amount of work done by the horses on the farm down to quarter days, the amount of feed consumed and its value.

This investigation has been carried on long enough and on a sufficient number of farms to give statistics whose dependability cannot be questioned.

The cost of feeding a horse a year varies greatly on different farms, the extremes varying as much as three hundred per cent.

The foregoing are just a few of the many important points brought out by Prof. W. F. Handschin of the Extension Department of the University of Illinois in his address before the Illinois State Veterinary Medical Association at its summer meeting in July.

Profit and Loss Will Determine the Issue

Veterinarians are directly interested in the number of horses kept on the farm. The number kept on the farm will ultimately, of course, be determined by the economy with which they may be used as a motive power on the farm, and the profit with which they may be supplanted by tractors. By encouraging their clients to diversify their crops and to feed them on the farm, veterinarians will adopt the most effective means for combatting the extensive use of tractors. The more diversified the crops and the greater number of live stock that are fed on the farm, the fewer number of idle days for the horses when they "eat their heads off", and the less place there will be for automotive power in the performance of farm labor.

In furnishing their clients with information on the feeding of animals, veterinarians have a fruitful field for service. The number of commercial feeds in this country is almost limitless. The farmer is constantly solicited to buy these feeds by alluring advertisements in every farm and live stock paper, by circulars in nearly every mail, by local dealers whenever the farmer goes to town and during the toil of the day on his farm by the stock food peddler who follows him about from task to task.

Some of these feeds have merit and are economical for some farmers under certain conditions; but the great majority of them exist for the purpose of making a profit for their manufacturers and distributors. Veterinarians should counsel their clients to seek information regarding commercial feeds from independent sources and not to rely too much upon the statements of the advertiser or the glib arguments of the distributor.

As a general rule, it may be said that a farmer should not buy in commercial feeds material produced on his own farm or materials that serve no purpose other than what may be served by those produced on his farm. Feeds containing a large percentage of fiber or cellulose should be avoided. Every farm produces plenty of this material. For example, one of the popular feeds consists principally of alfalfa meal and oat hulls. Alfalfa meal has few if any advantages over alfalfa, and oat hulls are no better than oat

chaff, or straw. It cannot be economical for the farmer to pay freight on these, the cost of milling, the cost of bags and a profit to the manufacturer and distributor. His own straw stack or that of his neighbor can usually supply the cruder material in these feeds at a comparatively small cost.

As a general proposition, the only food elements likely to be deficient in the feed of ordinary farms, are protein and perhaps mineral nutrients, and when purchasing feed, the farmer should purchase those high in these ingredients, as cotton-seed meal, tankage, bone meal, etc. Where the products of his fields are not sufficient to meet the needs for the other elements, he should resort to his neighbor's surplus, or to his local hay and grain market, rather than to contribute to the profit of many handlers, and dealers, pay the cost of milling, and of unnecessary freight charges and containers.

THE NEW PLAN FOR CHARGING FOR SWINE VACCINATION ON TRIAL

WITH some halting and friction, with an occasional jam here and there, but withal more smoothly than any had hoped, the new plan for charging for swine vaccination has been put into operation in Illinois; not in every case, but where the owners specifically ask that charges be made on the new basis. It is too early to say that the plan will cure the ills of swine vaccination, or that it will prevent or lessen farmer vaccination, or that it will materially increase the amount of vaccination done in this state, or even that it is workable. But, it gives evidence of being satisfactory. It is too early to condemn it *in toto*, although there is some evidence that modifications may be desirable. The reasonable thing would seem to be to suspend final judgment pending a time when from the acid test of use in actual practice, a better estimate of its advantages and disadvantages can be made.

A few self-appointed conservators of the veterinary profession, whose direct interest in the veterinarians of Illinois begins and ends with what they can sell them, have not hesitated to "horn in" on the matter with dire prophecies and farfetched arguments opposing the action unanimously taken by the veterinary association of the state. Although we grant that these advisers from afar have a perfect right to guard their legitimate commercial interests among the veterinarians of Illinois, it somewhat stretches our liberality to accord them, freely, the right to cloud and befog the issue; to promulgate spurious arguments against the contemplated action; to play upon any prejudice that may exist; to endeavor to embitter those who might be displeased with the action to be taken; to make cocksure statements for which there is no foundation in fact; in short, to endeavor to rock the boat while shooting the rapids, in the hope of endearing themselves commercially with those for whom they are so vociferously and illogically solicitous.

Our critics' gross perversion of statements made on this subject in our July issue concerns us only as it reveals their true object. To charge the other side with saying, what it never uttered, and then proceed to refute the alleged statement, is a practice as cunning as it is old. It is not used when one's case has merit of its own. Let it be repeated, the new plan for vaccination charges adopted in Illinois, does *not* provide for nor contemplate the regulation of charges for professional services, except to provide that such charges shall be reasonable and in keeping with the services rendered. Supplying anti-hog cholera serum, although perhaps a necessary veterinary service, is not a professional service; no state license is required to supply serum; a license is emphatically required to use it, except on one's own animals. The one is a professional service, the other a tradesman's service. Both services have heretofore been rendered by veterinarians. Probably they will continue to be so rendered. There is no professional or ethical reason for not charging for these two services separately. There may be business, or other reasons for not itemizing these charges; if so, we are in a fair way to find them out. At present, we have only opinions on the matter and with some of us, the opinions are not so very definite.

So much for what the new plan does not provide, i. e., for professional charges. It *does* provide for what is virtually a making public of the prices charged veterinarians for serum; and this is where the "holler" comes in; and my what a yowl it is! Few distributors have been guilty, but one admits a latitude of serum prices to veterinarians, ranging from 85 cents to $2.50 per hundred cc. This is worse than we thought, but we do know of the same identical make of serum, bearing the same license number, sold to users in this state at prices ranging from 90 cents to $1.35 per hundred cc, a range of fifty per cent. In many instances this explains why when a blanket charge was made for vaccination, one veterinarian's bill was higher than another's. This was one of the chief factors in bringing about the recent crisis in matters pertaining to swine vaccination. It was one and perhaps the most important abuse that the farmers' organization hoped to correct in asking that professional charges and charges for serum be separated. Is it any wonder that there was a protest, for commercial reasons? Fifty per cent additional on a sale here and there was a lucrative sinecure—while it could be kept quiet. The one-price houses, and that includes nearly all of the producers and distributors of anti-hog cholera serum, biologics and other veterinary supplies, have nothing to lose from the new arrangement. The veterinarian who has been mulcted for fifty per cent or any other percentage on the price of serum will be the gainer under the new arrangement, for his client will have more left with which to pay for *professional* services. His client will be the gainer for his vaccination will cost him less. The fair producer or distributor of serum will be the gainer for he will be relieved of an unfair competition. But somebody is going to lose and "He'll tell the world he's agin' it." In fact, he has already done so.

Book Reviews

PARASITES AND PARASITOSIS OF THE DOMESTIC ANIMAL

By

B. M. UNDERHILL, V. M. D.

Professor of Parasitology and Instructor in Zoology and Histology, School of Veterinary Medicine, University of Pennsylvania, Zoologist, Division of Laboratories, Pennsylvania State Bureau of Animal Industry.

Cloth, 379 pages, 180 illustrations. Published by The MacMillan Company, New York, 1920. Price $5.50.

We are glad this book has been published. It doesn't meet the need that exists for an American parasitology, but it is an important step in this direction—in some respects too elementary, but nevertheless much to be desired for what it does give.

The author has attempted to get together such information regarding animal parasites of this country as has heretofore existed only in scattered form, chiefly in the United States Department of Agriculture and state agricultural bulletins, but to some extent, in periodicals and independent articles. The search for and the compilation of the material in the bulletins has been thorough. The search of other literature on the subject has been only cursory, and not a little has been overlooked, including all the work of Ransom and Raffensperger on ascarid infestation of the lungs of pigs, the most important discovery in the realm of veterinary parasitology since the discovery that the fever tick is the carrier of the plasmodium of tick fever.

It is perhaps unavoidable that in collecting so much good material, some of decidedly the other kind has been collected along with it. Of this latter kind, one might point to the inference given in the text that demodectic mange is far more serious than sarcoptic and its treatment fraught with the greatest difficulty, and but rarely successful. And, again, the recommendation that benzine or chloroform be used to induce screw worms to leave their hosts and we suppose come out, curl up and wait for the veterinarian to hit them on the head with a little mallet.

Other instances of the unfortunate effect of tradition on the present work might be cited, but they might lead the reader to the belief that the work is not authoritative and reliable. Such is distinctly not the case. The first part of it is particularly to be commended, the introduction and the discussion on parasitism show a goodly evidence of the deep knowledge and the broad view of the subject together with a happy faculty for expressing it for a none too technical reader. The classification and description of parasites appears to have been well thought out. Unfortunately, the discussion of treatment is hardly in keeping with the remainder of the text. Much of the splendid research work of Hall and others on the subject of anthelmintics has received no attention; an unpardonable omission.

SHEEP DISEASES
By E. T. Baker

American Veterinary Publishing Co., Chicago, 1920, Cloth, 300 pages, 120 illustrations $3.50.

This book consists of twenty-seven chapters. Although its title indicates that it is devoted to the diseases of sheep, we find chapters on the History of the Breeds of Sheep, The Wool Industry, Anatomy, Hygiene, Predatory Animals and Quarantine and Transportation Regulations.

The present effort on the part of those directly or indirectly related to the sheep-raising industry is to stimulate the production of more animals. The instruction on the diseases of sheep which has been given at the various veterinary colleges has been very meager. The author of this volume has had a very extensive experience with sheep on the western range country. It is quite apparent, however, that the conditions under which sheep are kept there and the conditions as found in the central and eastern states are quite different. Parasitic diseases with the possible addition of the condition commonly referred to as hemorrhagic septicemia, include nearly all those affections which are of great economic importance in this latter country.

The presentation of the subject matter is very brief. Detailed accounts with specific references are usually lacking. In the discussion on stomach worm disease no mention is made of the extensive and exceedingly important work of Veglia. The nomenclature is not modern, (*Strongylus contortus, Strongylus filaria*). In speaking of the entropion operation it is stated that "This can be performed only by an experienced veterinarian." No directions for preforming this relatively simple operation are given. In many ways this book is better adapted to the needs of the sheep herders than to the veterinarian.

We cannot agree with the author when he states in relation to blackleg, "These finer distinctions are of more value to the laboratory worker than to the man in the field, and the latter will be satisfied to call a disease that can be controlled by blackleg vaccine, the well known and common malady."

As stated in the preface the aim has been to keep the book "practical." Exceedingly helpful suggestions are given for the handling of sheep, for their restraint, for the selection of the common medicines and their administration. The account given of diseases due to poisonous plants is quite clear but brief. The book is printed on a very excellent quality of paper and the cuts are fine.—C. P. Fitch.

VALUE OF BACTERINS AGAINST HEMORRHAGIC SEPTICEMIA

THE Nebraska Agricultural Experiment Station at Lincoln has just issued a bulletin, Research Bulletin No. 17, by Drs. L. Van Es and H. M. Martin, giving an account of some experiments made to determine the antigenic value of commercial hemorrhagic septicemia bacterins.

The conclusions drawn from the experiments are surprising, in view of the opinion held by the large number of practitioners who have used such bacterins extensively. The conclusions are as follows:

"It does not appear that the vaccines and bacterins experimented with have any antigenic value which expresses itself in actual resistance to B. bipolaris infection. We encountered uniform negative results, no matter if we injected these

substances once or a dozen times; a virus injection was always certain to kill the animals.

"The indications are that if hemorrhagic septicemia is in reality a frequent and very fatal disease to our farm animals, that the commercial immunizing agents against it are indeed a poor staff to lean on and that if these diseases are at all to be combated in a serious manner, we will have to look to other methods for relief."

Many practitioners, as a result of their experience in the use of hemorrhagic septicemia bacterins, have come to regard them not only on a par with smallpox vaccine and typhoid bacterins as prophylactic measures, but as equal to diphtheria antitoxin as curative measures.

In fact, although these bacterins have been used in enormous quantities, there have been few unfavorable reports on them since the first announcement of their successful use against hemorrhagic septicemia among the herds of buffalo in Yellowstone National Park under the direction of the Federal Bureau of Animal Industry.

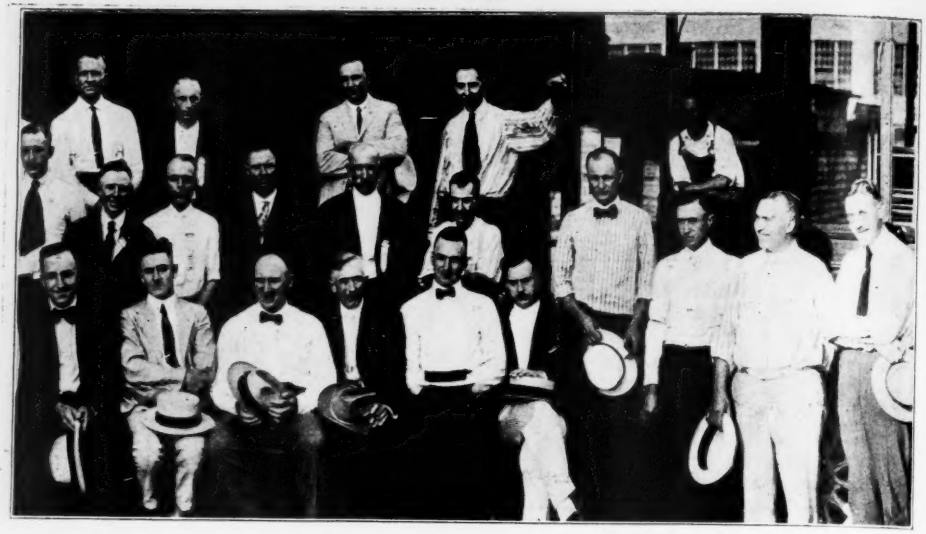
So sure are many veterinarians of the action of hemorrhagic septicemia bacterins that they do not hesitate to use them as diagnostic agents; that is, in an outbreak of disease that it appears might be hemorrhagic septicemia, bacterins have been used and if the outbreak was stopped, they did not hesitate to call the trouble hemorrhagic septicemia. If the bacterins proved ineffectual, further search was made to discover the cause of the trouble, and in many instances, it must be said it has been found to be something else.

Practitioners will want to know if a test of hemorrhagic septicemia bacterins made in the laboratory on rabbits is conclusive as to its effect in the field on cattle, sheep or swine. The Nebraska bulletin raises the question that practitioners will want to see answered, and soon. We trust that this research work will be continued by Drs. Van Es and Martin and that it will be taken up by others.

MEMBERS AND GUESTS IN ATTENDANCE AT THE TWENTY-SEVENTH ANNUAL MEETING OF THE MISSOURI VALLEY VETERINARY ASSOCIATION, HELD IN OMAHA, JULY 12, 13 and 14, 1920. (Continued on the following page.) (A report of the meeting will be found elsewhere in this issue.)

In this connection the following excerpt from an editorial resume of the progress in veterinary science for the preceding year, published in the issue of The Quarterly Journal of Veterinary Science and Army Animal Management for October, 1883, is of interest as showing a wavering of accepted opinion on the use of veterinary biologics nearly forty years ago.

"Recent German and English researches have tended to throw very much doubt on Pasteur's conclusions. Indeed, Pasteur's anthrax vaccination theory has been rather over-done; Bacteria have been found in every disease, learned treatises have been written and found to be badly based, experiments have been repeated with opposite results, and a general doubt has been thrown over the whole Pasteurian philosophy. It has,

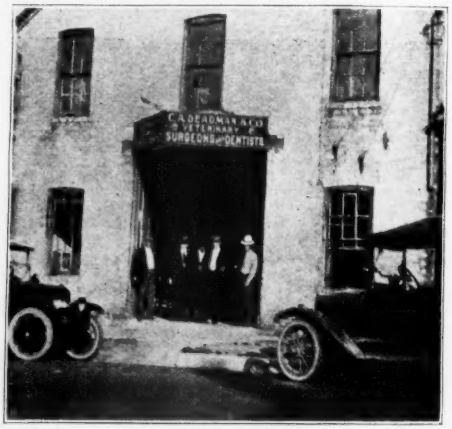


moreover, been shown that the less trumpeted researches of Toussaint, Perroncito, and other veterinary scientists have been more solid than those of Pasteur, and in many cases can claim priority which tends to be recognized. Thus, however much Pasteur may have been at fault in rushing at conclusions (and undoubtedly his brilliant genius enabled him to arrive at conclusions in many cases successfully), there is solid advancement in our knowledge of specific diseases; the bacteria of anthrax, tuberculosis, and glanders are now recognized facts in pathology; those of rinderpest, hog cholera, distemper, etc., are probabilities. Recent investigations of rabies have thrown much light on the pathological anatomy, causes, and true nature of that affection. The questions of protective inoculation for pleuropneumonia, zymotica and rabies have made some progress towards solution.

ILLINOIS VETERINARY EXAMINATION

Announcement is made by the Department of Registration and Education, Springfield, Ill., that examinations for veterinary licenses will be held in Springfield, Monday and Tuesday, October 25 and 26.

Applicants should have their applications on file at least ten days prior to the date of the examination. Further information may be secured by addressing F. C. Dodds, Superintendent of Registration, Springfield, Ill.



CHICAGO VETERINARIANS IN MADISON.

From the reader's left to right the figures in the doorway are: Dr. C. A. Deadman, Madison; Dr. C. A. Zell, Chicago; Dr. H. S. Johnson, Dr. Deadman's assistant; Dr. E. L. Quitman, Chicago, and Dr. James Weigen, of Sun Prairie, Wis.

The building is the hospital of Dr. C. A. Deadman, of Madison, Wis. Dr. Deadman has been contending with an outbreak of canine typhus or Stuttgart's disease in Madison for the past six months. This is the first serious outbreak of this disease to be recognized in Madison and it has been unusually severe. A large number of dogs have been affected and the mortality has been high.

Of course, Dr. Deadman asked his visitors from Chicago, where the disease has been prevalent for many years, for a successful treatment. Dr. Quitman recommended sodium cacodylate hypodermically and Dr. Zell, Flavisol intravenously. Dr. Deadman can now look with equanimity on these cases as they approach his hospital, since he has two means of curing them.

DEPARTMENT OF

CATTLE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

Professor of Bovine Medicine, New York State Veterinary College at New York University, New York City

Diagnosis of Pregnancy

IN my previous articles I emphasized the necessity of diagnosing and differentiating pregnancy, particularly early pregnancy, from pathological conditions of the uterus that might simulate pregnancy; in other words, the differentiating of pregnancy, so as to avoid the killing of the delicate embryo by severe manipulation of the horn or horns; or the equally certain death and expulsion of the fetus, by pressing out of the ovary, a true corpus luteum, or the corpus luteum of pregnancy.

I confess that I do not know how to sufficiently emphasize this danger, as it seems to be one of the most common and constant errors of inexperienced operators ,and I doubt if there is any other thing that so enrages an owner as to have a veterinarian abort an animal, that the owner has been sufficiently anxious about to consult an expert, to determine, if possible, why the cow has not bred more promptly, or why she is not showing regular periods of estrum.

I have repeatedly cautioned against the unreliability of any breeding history that may be presented to us. It matters not how accurate the records are supposed to be kept, or how certain the attendant is as to his information, we must not let this mislead us. The information we gain from examination must be our guidance and other information simply accessory. This is not only true in diagnosing early pregnancy, but is well to keep in mind, that ordinarily it is much easier to diagnose a six weeks' than a six months' pregnancy. To show how misleading records may be, I will cite the following case:

On April 24, 1918, I examined a pure-bred Guernsey cow, the breeding record showing that she was due to calve March 8, 1918, and that about Feb. 1, 1918, she had been ill, with a very high temperature, and had been attended by a thoroughly capable veterinarian, whose whole life has been spent among cattle. The owner and herdsman reported that both the veterinarian and herdsman had at that time palpated the calf in the right flank very plainly. They were fearful at the time that the cow would lose her calf, owing to the high temperature she carried. However she recovered without aborting and, according to their figures, was six weeks overdue at the time I examined her. I pronounced the cow pregnant, carrying a six month's calf. This the owner and herdsman were quite positive could not be true for two reasons. First, the bulls and cows were kept absolutely apart in distinct buildings and the herdsman directed all breeding, and he was certain that the cow could not have been served without his knowledge and direction. Secondly, the veterinarian and herdsman both had palpated at least an eight months' calf in February.

The error of their records is still unsolved; nevertheless the cow dropped a calf on July 30, 1918, three months and six days after the day I examined her.

It is not an easy matter to give instructions for the diagnosis of early pregnancy, still there are certain things that aid us materially, and when combined, make a diagnosis about as accurate as it is humanly possible to secure.

The history will usually be of some value, particularly where an animal has

been a regular breeder and has passed one or more periods of estrum, but when it is desired by those in charge, as is so often the case at the present time, in large herds, that the animals be examined to determine definitely whether or not they are pregnant, so that there will be no delay in giving the necessary attention to have them breed at the desirable time, the passing of an estrual period is of little value in the diagnosis.

It is common knowledge that ordinarily when an animal conceives, she ceases to have periods of estrum, but this is not always the case; we not infrequently see cows take the service of the bull at regular or irregular intervals, during a part or the whole of the period of pregnancy; consequently this weakens the reliability of the cessation of estrum. Conversely, animals that are not pregnant, ordinarily have regular or irregular periods of estrum, but again, very often a corpus luteum fails to be absorbed between the estrual periods and such will cause a cessation of estrum for an indefinite period, just as certainly as a true corpus luteum of pregnancy; therefore from the minute we enter the vagina, until we have carefully examined the cervix, horns and ovaries, it is well to proceed with the most delicate touch and careful manipulation.

How Early Can Pregnancy Be Diagnosed?

The question is frequently asked, how early can pregnancy be diagnosed? I can best answer that by stating that in herds where I make regular examinations to verify the records and to determine if the animals are breeding, unless there is some particular reason, I prefer not to examine an animal for pregnancy, until at least five, and preferably six weeks after it has been bred. I will admit that where the organs are ideally normal and if upon examination the cervix be found closed tightly and the vagina sticky, particularly near the cervix, and there is found a distinct asymetry of the two horns, but not asymetry enough to give any definite information by palpation of the horns alone, and if in addition a distinct corpus luteum be found standing out on the ovary, corresponding to the enlarged horn, and the history is that the animal was bred four weeks previous, one would doubtless be justified in stating that she was four weeks' pregnant, but this is an ideal co-ordination.

But, on the other hand, in examining an animal that has been bred four weeks, one may find a cervix that in no way indicates the formation of a seal, even though the animal be pregnant. One may also find in a middle-aged cow that has been bred several times, two horns similar as to size, particularly if she is this time pregnant in the left horn when her previous pregnancies have all been in the right horn; or if there is a slight asymetry of the horn, one may fail to outline a distinct corpus luteum in that ovary, even though she be pregnant; with the result that one finds one's self face to face with the proposition that it is either a pregnant horn or a horn slightly catharrhal.

If the ovary is enlarged and one is in doubt whether it is a true corpus luteum or a cystic degenerated corpus luteum, there is no way to determine except by putting sufficient pressure on the ovary to remove the corpus luteum of pregnancy if there be one, or to crush the deep-seated cyst or cystic corpus luteum, if that be the case.

The natural and safe thing to do is to leave the ovary and horn alone, for at least two weeks longer. The result of such an examination is unsatisfactory both for the veterinarian and others, which is the reason why I stated above, that unless there is some particular reason I prefer not to attempt to diagnose pregnancy under six weeks.

On the other hand, it is my belief, that six weeks' pregnancy is practically one hundred per cent diagnosable. When the rectum has been emptied, the cervix is grasped with one hand and drawn gently back, and with the other hand in the rectum on the floor of the pelvic cavity or just anterior to it, the uterine horns will be found. The bulk of the fetus and its liquids, and the thinness of the uterine horns at this early period are really quite astonishing. It already has assumed the feeling of an intestinal horn filled with liquid, and in those uteri in which the horn enlarges in circumference

rather than in length, it is just about the size that a man's hand can cover nicely; thin and fluctuating.

Occasionally one finds a uterus in which the enlargement seems to affect the entire horn rather than the middle part. In these cases the fluctuation and pronounced thinness of the horn, is not so noticeable, and it is well to follow the enlarged horn to its end and gently locate the corpus luteum of the ovary, or an enlarged ovary indicating a corpus luteum is found.

After one has palpated a few horns of this type, they are usually as readily diagnosable as one in which the fetus and fluids are more circumscribed.

Changes Easily Noted

From six weeks on there is such a daily increase in the size of the pregnant horn that it is almost perceptible from day to day, so much so, that after one has had considerable experience in examining pregnant uteri, one can often be of service in straightening out the breeding records of a herd, it being possible usually in from six to twelve weeks, to determine the age of a fetus to within at least three or four days. After twelve weeks the uterus begins to draw ahead gradually and while one can plainly palpate the top and sides of it, still ordinarily one cannot raise it in the hand and get the full outline so as to estimate the size, as can be done earlier. It is well always to locate the non-pregnant horn, in very early pregnancy if at all in doubt, and it will be found somewhat like a small appendage growing out from the pregnant horn; and if still in doubt as to the diagnosis, the cervix may be drawn back and examined more closely to determine if a seal is forming. If a seal is plainly visible, it is of course a very good indication of pregnancy, which is also true in cases where the seal is not visible, if particles of the seal adhere to a small catheter passed part way into the cervix; but again a substance closely resembling a seal is occasionally found in the cervical canal of a non-pregnant animal, or unfortunately *any evidence whatsoever of a seal may be quite wanting in a pregnant animal.* However, all of this confusing examination is unnecessary to the experienced operator, if the animal is six weeks' pregnant. In twin pregnancy, naturally there is not the asymetry of horn, but there is the same fluctuating enlargement with the thin firmness of the horn walls to differentiate it from catharrh of the uterus, and the thin smooth feeling, with the quick moving liquid, to differentiate it from a uterus suffering from pyometra, with a denser feeling and a slow moving liquid, which we will discuss later.

From the third month on there is naturally considerable change in size and form of the uterus, to accommodate the volume and position of the fetus and its membranes. The walls become tenser, the fetal fluids are quite easily recognized and from about the third month on, the cotolyedons may be palpated, and at the fifth month it is sometimes possible to palpate the fetus floating in the fluid, becoming more and more recognizable until about the sixth month, when the fetus may rather suddenly drop to the floor of the abdomen and be entirely out of reach, until around the eighth month but one is always justified in suspecting advanced pregnancy when on entering the vagina the cervix is found pulled well forward. These suspicions are further substantiated even if one cannot locate the uterus, but finds the fundus drawn as a flattened band over the anterior border of the pubis. At this period of pregnancy much reliability may be placed on the enlargement of the middle uterine artery, which is usually enlarged to one-half inch in diameter and the throbbing is plainly felt through the rectal wall.

It is true that a growth in the uterus might be of sufficient weight to draw it down, as does the fetus, but in such cases the absence of the enlargement of the uterine artery and other obtainable information, such as the last breeding date, may be of assistance in the diagnosis.

Fortunately from the sixth to the ninth month there are certain changes in the size of the abdomen and the position of the fetus, which enables one usually to get rather definite information as to the approximate age of the fetus.

When the fetus acquires sufficient weight to pull it downward and forward

on the abdominal floor, the anterior extremity of the gravid uterus lies close to the diaphragm. The weight of the fetus and the horizontal position of its body tends to keep it in an anteroposterior position. By the arrangement of the circulation, the anterior portion of the fetus in early life receives more arterial blood than the posterior, which causes the anterior portion from greater weight, to rest downward and toward the fundus, rather than toward the conical extremity of the horn, but later, when the hinder parts become more developed, they exceed in weight the anterior part of the body. By this time the uterus is lying upon the abdominal floor and naturally the posterior part occupies the lowest point, with the head still pointing toward the fundus, and owing to the size of the fetus and the shape of the horn, the fetus has a fixed position, hence the greater majority of presentations are anterior.

The position of the fetus also explains why when attempting to locate, say a seven month's fetus, by ballottement, it may be necessary to reach quite under the abdomen; while as pregnancy advances it becomes much simpler to locate the fetus in the right flank, there being a gradual advancement backward and upward toward the pelvis, until near the end of pregnancy, when the anterior extremity of the fetus approaches the inlet of the pelvis; consequently when once the fetus can be located by ballottement, one can again get fairly accurate information as to about the period of gestation, from the location of the fetus from the outside, which of course may be confirmed by rectal examination if desirable.

HEIFERS TWINNED WITH BULLS RARELY FERTILE

Having read and enjoyed a great many of your articles in the Journal, I take the liberty of writing and asking your opinion in regard to the fertility of a heifer that was a twin, the other twin being a bull.—J. P. C., Mass.

REPLY: Heifers that are twinned with bulls rarely breed, but they do breed frequently enough to make it necessary to qualify any statement made on the matter. Probably from all the information we have, it would be a fair guess to say that about two per cent of twin heifers born with bulls do breed. Some embryologists give explanations as to *why some such heifers do breed,* but the explanation of why they do breed is not nearly so satisfactory as the information we have as to *why they do not breed.*

I have had an unusual opportunity to examine heifer calves that were known to have been twinned with a bull, as I am located in a dairy district and calf buyers are constantly on the road picking up young calves. These calves are all slaughtered quite near us, and for years, the calf buyers were good enough to advise me when they found a pair of twins of opposite sexes, giving me a good opportunity to examine the generative organs. I have examined hundreds of them but never in a single instance of a heifer calf twinned with a bull, did I ever find the female organs complete and normal; in fact I never found anything that appeared like a normal ovary. I have found, however, fairly normal appearing uteri, some with one horn and tube ending in a blind cul-de-sac, and no evidence whatever of uterus, tubes or ovaries. This has been equally true in cases I have examined since I have been particularly interested in sterility work.

I have run on to 27 free-martins so far without finding a single one sufficiently developed to make it possible for them ever to conceive. I have seen two heifers that were said to be (and probably were, judging from the records and the reliability of the owners) sisters to twin bulls, that were breeding.

It would be interesting and we would greatly appreciate it if the readers of the Journal would favor us with statistics of the number of free-martins they have seen and the number that have bred.—J. F. D.

COMMENT BY LEON J. COLE, PROFESSOR OF GENETICS, U. OF WIS.: My experience based on a very considerable number of records which I collected some years ago, agrees very closely with that of Dr. DeVine, except that I am inclined to think the proportion of heifers twinned with bulls which are capable of breeding is somewhat higher than his estimate of two per cent. My data are not tabulated just now, however, so that I cannot give a percentage from them, and I am not able to spare the

time just at present to bring them together for that purpose.

Is it not possible that one examining only free-martins brought to slaughter would probably get a higher percentage of non-breeders than actually exists, as could be determined if all individuals could be examined? It is my experience that a good many breeders of dairy cattle are inclined to keep free-martin heifers for a time to see whether they show evidence of developing as breeders. If they obviously do not, they are slaughtered; but the others are usually retained at least until they are old enough to breed, if they ever will.

This whole subject of the free-martin has received very considerable attention in the past few years. You are doubtless familiar with the classical work of Dr. Lillie of the University of Chicago on the embryological relations of the embryos. I have supplied one of Dr. Lillie's students with sex glands from free-martins and he writes me that his report on them will be out this fall.

One of our students here also prepared a thesis two or three years ago on an anatomical discussion of a series of specimens which I had collected. This thesis has not yet been published, but I hope we shall be able to get it out sometime this year.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOUGNAL OF VETERINARY MEDICINE and no charge will be made for this service.

Alsike Clover Poisoning

A FEW days ago the writer received from Miss Ristine of Fort Dodge, Ia., a letter stating that some horses were afflicted with a disease in Mr. A. Lund's pasture. She asked whether it could be possible that this trouble was caused by five-finger weed. In company with Mr. G. F. Finlay of Sidney, Australia, the writer examined the pasture. In going over the pasture we found a great deal of white cockle (*Lychnis alba*), Germander (*Teucrium ocidentale*), horse weed (*Erigeron canadense*), three-seeded mercury (*Acalypha virginica*), lambs quarters (*Chenopodium album*), some smartweed, (*Polygonum pennsylvanicum*), which apparently had not been touched by the horses or cattle. The only one of these plants that was at all suspicious was the white cockle which is a member of the pink family. Some of the plants like corn cockle are known to be poisonous, many of the plants having saponin like substances.

Mr. Lund had a fine stand of alsike clover. Upon question I found that the cattle had not suffered in any way. After examining the diseased animals, we concluded that the trouble was due to alsike clover. Mr. Finlay tells me that recent investigations in Australia have shown that similar trouble may sometimes be produced by trefoil.

The following letter was received from Dr. H. J. Shore:

"Miss Ristine has advised me that you were kind enough to visit the Andrew Lund farm near Vincent a few days ago and investigate the report of an irritating or poisonous plant said to exist in his pasture. She also requested that you be furnished with information concerning the lesions found in the animals thought to be affected with this plant.

"The attention of this laboratory was first directed to the matter by Dr. L. E. Ludgate, a practicing veterinarian of Ft. Dodge. A representative of the laboratories

who went to the farm with Dr. Ludgate found that Mr. Lund had within the day or two preceding the visit taken his horses out of the pasture for the purpose of putting them to work on the farm. He then found that the horses all showed lesions in the tongue and buccal mucous membrane. All of the horses were bays or browns according to my understanding. The only external lesions found were around the lips and muzzle where skin had been removed by rubbing. No blisters or other eruptions were found externally. The tongue appeared to be mostly affected, and this organ showed extensive desquamation of the membrane and considerable ulceration. The ulcers were not deep, however. There was an odor due to the decomposition of food and tissue. The horses appeared healthy in other respects and manifested considerable appetite but were unable to eat because of the lesions found.

"Mr. Lund had other horses in the barn which had never been in the pasture, and these animals were normal in every respect. He also had in the pasture some cattle. It may be interesting to know that these cattle had white spots on them but in no case was there any irritation of the skin. Further, the cattle showed no lesions in their mouths as the horses had.

"I have been advised this morning by Dr. Ludgate that the horses are now practically well and that they have not been in the pasture since removal some ten days or two week ago."

A letter from Dr. Ludgate describes the symptoms as follows:

"Acute stomatitis, necrotic areas over neck, face and body; pruritis, bowel movement normal; temperature 101.5°; pulse normal; purulent discharge from the eyes."

This disease was first described by Dr. Jacob Moses and A. M. Harcourt of the Kentucky Agricultural Experiment Station as follows:

"On the skin are inflamed areas, appearing at first as more or less rounded vesicular swellings, varying from one-half inch to five or six inches, or more in diameter. The hair over the affected areas stands erect and has a dull appearance, indicating loss of vitality. Later the skin becomes hard and puffed out, as the result of the formation of pus underneath. Finally, the deadened skin is cast off, leaving a deep, raw, angry-looking ulcer, which eventually heals, with the formation of a conspicuous scar, covered with more or less white hair. These changes in the skin may occur on any part of the animal, but especially on the limbs, body and croup. The eye symptoms consist of a marked conjunctivitis, with swelling of the eyelids, sensitiveness to light, and watery discharge from one or both eyes. The mucous membranes of the mouth become inflamed (stomatitis), ulcers form, and the animal slobbers and refuses to eat. The advanced cases are frequently accompanied by emaciation. The tongue is usually affected and the inflammation may extend throughout the entire digestive tract. The functions of the liver may be disturbed, and a yellowish (jaundice) coloration of the tissues follows. In such cases symptoms of colic are not uncommon, and the respiratory tract may become involved and pneumonia develop. Some observers in other countries have noticed marked nervous symptoms, such as excitement, convulsive movements, staggering gait, and paralysis of the throat, with inability to swallow, the paralysis at times becoming generalized, the animal getting down and being unable to rise. In the cases observed in this state, the nervous symptoms except the general depression, were not very noticeable."

Since the animals were removed from the pasture they have fully recovered.

BRACTED PLANTAIN

Dr. F. L. Roach of Preston, Iowa, sends a specimen of bracted plantain (*Plantago aristata*) with the following letter:

"Under separate cover I am sending you a plant from a hog yard in which hogs are being lost with a peculiar malady. As this is the first year the plant has appeared in the pasture we are desirous of having your opinion as to the probability of its causing the disease."

Bracted plantain is a common weed in the southern part of Iowa and northern part of Missouri. I do not know that the plant has ever been reported as poisonous. The seeds of one of the plantains are used in medicine because of the mucilaginous properties of the seed. English authorities on forage plants sometimes use buckhorn a related species, as forage plant. One of our common plantains is used while the other is avoided by stock.

Dr. Gray is authority for the statement

that cattle can distinguish these species, one they eat and the other they do not. I do not believe that bracted plantain is injurious.

EUROPEAN MORNING GLORY SUSPECTED OF BEING POISONOUS

Dr. J. N. Cozzens, a subscriber of this Journal, a few days ago, came to me with a quantity of European morning glory (*Convolvulus arvensis*) which he suspected of being poisonous. The writer in company with Mr. Finlay and Dr. Cozzens went over the pasture which has been closely grazed and found a great deal of the morning glory along with a great deal of young three-seeded mercury (*Acalypha viriginica*), young small ragweed (*Ambrosia artemisiifolia*). It was the ordinary Iowa pasture with white clover and some timothy and blue grass, nothing out of the ordinary, except this morning glory and the three-seeded mercury. The three-seeded mercury was very young and evidently this had not been grazed to any extent. Some of its relatives, as spurge, croton and castor bean, are known to be poisonous. The European morning glory had been closely grazed and during the morning the fields were white with the flowers of this plant.

So far as I know, this plant has never been generally regarded as being a very poisonous plant, though it has been listed as such. It is known that some members of the family are strong purgatives. The symptoms as given to me by Dr. Cozzens were as follows:

"I was called to the farm of Fred Hornick, two miles west and three miles north of State Center, Iowa, to see a sick horse. Upon my arrival, I found the horse out in the pasture. The horse was down and completely paralyzed, which condition had been preceded by purging. I gave a stimulant, but without results. The horse died the next day, on June 29, and the following day I found another horse in the same condition. The symptoms seemed to indicate poisoning. I found an abundance of this vine with small bell-shaped flowers, resembling morning glories. The horses had access to some corn silage, one very little and the other a shovel full. Can this be the trouble?"

The writer made an examination of the silage, which had been kept in a brick silo and was not moldy. It had the usual slightly acid flavor. Upon inquiry I found that several other horses in the vicinity had died during the winter, apparently from silage poisoning. In all of these cases the silage was from a wooden silo with numerous cracks. It is probable that these deaths may have been caused by silage, but no diagnosis was made.

I should like to know whether any of the readers of the Journal have ever had suspicions in regard to the European morning glory. It is strang, if this is poisonous, that the literature does not contain more reference to it, since the plant is common in eastern North America.

The cause of death in these cases, therefore, would seem to be very uncertain.

ANTHELMINTICS AND INSECTICIDES

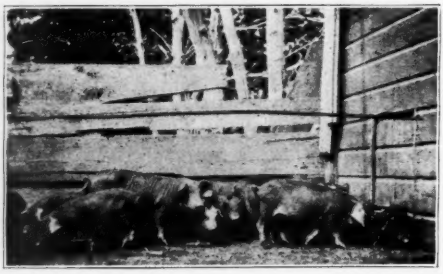
(*Continued from Page* 424)

is such that there is no likelihood that they would voluntarily ingest an anthelmintic in any vehicle that might be used; furthermore, these worms are apparently as well supplied with food in the fasting animal as in the one recently fed. It is commonly believed that the passage of worms, especially in large numbers, indicates that a treatment has been entirely effective; whereas, with the anthelmintics in common use, experiment shows that they frequently leave behind many more than they remove.

At the present time, published knowledge on veterinary anthelmintics and insecticides is in a rather unsatisfactory condition, being scattered over publications ranging from the dispensatory, pharmacopoeia and texts on materia medica, pharmacology and therapeutics, to the veterinary columns of the farm papers. The writer is now making an effort to gather that knowledge together and to sift from it what appears to be the most valuable portion in the light of several years of experimental work along this line. There are many points on which we have no experimental information. The getting together of scattered information under one cover always simplifies the work of investigators and should be of value to the student and practitioner. The fact that the future will furnish us something better than the present does not warrant us in neglecting the best that is today available.

"Mixed Infection"

Mixed infections in swine are today causing the practitioner more alarm than any other disease has for a number of years. During the past season we found herds in which symptoms of cholera were associated with symptoms of so-called mixed infections, or vice versa. Perhaps in the years to come we will be able to untangle this mixed infection and then be able to recognize certain forms of one infection. I shall not be surprised if some day we may consider hog cholera a septicemic form of hemorrhagic septicemia as is sometimes seen in cattle. The three pictures show pigs displaying various symptoms.

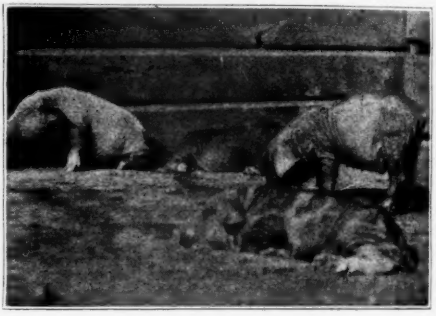


Some of those showing the slightest symptoms of illness died very suddenly, which would lead one to suspect cholera. Picture No. 1 shows a group of pigs taken from a herd in which could be found symptoms of various diseases. The two pigs to the left (X) show symptoms of cholera—drooping head, slightly arched back, high temperature and loss of appetite. One destroyed for autopsy showed lesions of cholera predominating, while one of the pigs in the center of the picture (O) on autopsy showed well marked lesions of necrotic enteritis. Smears were made from washed portions of infected bowels and many bi-polar-staining organisms simulating the bacillus of H. S. were found. The temperature of these two pigs was found to be subnormal by several degrees. The bowels were constipated, the appetite fairly good, but there was a general tendency to emaciation. The intestinal lesions were in the form of ulcers in the large bowel. I have often noticed that where the animal is constipated the intestinal lesions are localized and the temperature is generally subnormal; while in cases where diarrhea is present the temperature is generally high and the autopsy will show a generalized infection of the bowels. If the animal is somewhat constipated and shows a high temperature look out for cholera. I have found that this is a valuable factor in making a differential diagnosis. Next to the building is a pig that has gone down in the hind quarters; otherwise the symptoms were similar to those of the two pigs in the center of the group.

Here there are several showing various symptoms. The one in the center of the picture broke down just before the picture was taken. This view and the following one were taken about two weeks after treatment. The spotted pig at the left, it will be noted, is holding the right fore foot in an elevated position, being unable to bear weight upon it. When affected in this way, all the symptoms of rheumatic arthritis are present, due, I believe, to toxins circulating in the system. The skin is scurfy, thickened and the joints are enlarged. This pig recovered but remained a runt and was later destroyed by the owner. These pigs were in bad condition when the herd was treated and no treatment was advised as I thought it would be useless, but the owner insisted on giving them something and running a chance, as he said, "The hog-raising business is getting to be quite a game of chance now-a-days." They received an average dose of serum and a dose of mixed infection bacterins without apparent benefit. This bunch of pigs was kept in a separate pen and fed milk and oats. In those that go down in the hind quarters I find some can be benefited by the administration of serum, bacterins and sodium cacodylate if taken in time. I am of the opinion that this condition is due to an amyloid degeneration of the kidneys brought on by the constant elimination of toxins from the system. We also see these lesions in the liver and spleen in many of the animals affected in that way.

Quarantined.

More sick hogs and a bad bunch, too. On entering this lot the pigs were found lying along the fences, sheds, and almost anywhere they could find shade. They were droopy, lame, thirsty, appetite gone, some going down in hind quarters as may be seen in the first picture. Some were affected with paroxysms of coughing, almost choking—and many were seen to rear in the air gasping for breath following one of these attacks. Many showed weakness of the hind quarters and broke down upon a little exertion as is shown by the pig in the background in the central part of the picture. At the other end of the shed some dead hogs were lying. There were fifteen pigs in this lot and I found parts of hog carcasses lying around. The chickens were picking the bones of parts that dogs had not carried away. About the straw pile were found more dead and dying hogs. The owner had gone to Minnesota and left a man in charge to care for the stock. I did not know of the conditions until a neighbor informed me about how things looked and I decided to investigate. In all we found 25 dead pigs lying around, and I lost no time in getting the attendant busy burning the dead ones and shutting up the sick ones. A quarantine card was posted on the buildings in a conspicuous place, and I was later informed by one of the neighbors that the owner threatened to wring my neck the first time he saw me. I have seen the gentleman since, and although he did not wring my neck, he informed me that I had done my last bit of work for him. I am not sorry for taking the course I did, as losing the one client has gained me several others, because they realized what I did was for the benefit of the community.



Williams, Ia.

W. P. Bossenberger.

Department of Laboratory Diagnosis

Edited by Dr. C. A. Zell

Sleeping Sickness in Fowls

I am sending you, by special delivery, a few specimens taken from two hens that I killed. My client lost ten fowls in one night. They seemed all right at roosting time, but were found lying under the roost in the morning and soon died.

Symptoms: The affected chickens lie around and when aroused or urged to move are disinclined to use their legs, but when urged sufficiently, will tumble about. The head hangs down and there is diarrhea rather white in color.

These chickens have access to springs in a ravine in which poison ivy is growing. The ivy has berries on it, and this has led me to wonder if the chickens were poisoned. There was no signs of cholera. All organs appeared normal on postmortem examination.

A diagnosis and treatment is desired.—A. J. W., Virginia.

REPLY: No evidence of poisoning was found in the specimens of chicken intestines received. The mucous membrane of the intestine was slightly hyperemic, but no ulcers nor erosions were present.

The feces were of a thin, creamy consistency, with no signs of blood.

The bacteriological examination revealed a long-chain streptococcus with typical capsule formation—organisms that seem to be identical with the streptococcus capsularis gallinarum, an organism known to produce symptoms of "sleeping sickness" in chickens (Nocard and Dammann and Manegold).

We shall isolate this streptococcus and do some more investigational work and would appreciate it very much if you would send us some more cases from this flock. Please send a whole chicken rather than parts the next time. Pluck the bird and wrap in a cloth saturated with a ten per cent solution of formalin. Do not open the bird.—C. A. Z.

STREPTOCOCCI AND POSSIBLY HEMORRHAGIC SEPTICEMIA

The agar culture sent you, under separate cover, was made from the blood of a horse just before it was destroyed. A diagnosis is requested.

The animal had the following history, symptoms and postmortem lesions: The horse was brought to the hospital on July 11th, with a temperature of 105° F., breathing and heart action accelerated. The animal ate and drank with great difficulty, there was a constant grinding of the jaws and rolling of the tongue; conjunctiva covered with petechia; dark serous discharge from the nostrils; mucopurulent discharge from the eyes; sensitive edematous swellings from the throat down the neck and between the front legs; swellings became so large that breathing was difficult; general dejected appearance.

Postmortem findings were: Swollen pharynx with petechia and serious inflammation; mucous membrane of stomach hemorrhagic; a few petechial spots on the serous membrane of the intestines; lymph-glands swollen, with serous infiltration. The kidneys also showed serous infiltration; the spleen was covered with petechia; the liver also covered with petechia and serous infiltration, the lungs showed large congested areas. All edematous swellings showed serous infiltration and deep seated hemorrhagic areas throughout the tissue.

A few days prior to this, another horse was destroyed from the adjoining corral, showing the following symptoms and postmortem findings.

The horse was brought to the hospital on June 28th, 1920, with a history of having been taken out to exercise and giving out. He arrived at the hospital showing symptoms of heat exhaustion with the exception of the conjunctiva which was icteric. The animal ate and drank very little and with difficulty. Temperature 105° F., breathing and heart accelerated; gait very weak and wabbly. A diarrhea started two days later, which could not be stopped; the horse gradually grew weaker, and on July 7th, petechia appeared on the conjunctiva and heavy serous discharge started from the nose.

On July 8th, the horse was so weak that it was quite an effort for him to stand on his feet, so he was destroyed and posted.

Postmortem examination showed petechia covering all the serous membrane of the intestines and abdominal cavity. The mucous membrane of the stomach was covered with petechia, and the abdominal muscles showed a few deep-seated hemorrhagic areas. All lymph-glands, including the submaxillary, bronchial, mediastinal and mesentery showed serous infiltration; the kidneys also showed serous infiltration. The liver was mottled and contained thousands of calcified nodules; the lungs were apparently normal with the exception of thousands of calcareous nodules. The lungs and liver were masses of calcified nodules; the heart was slightly enlarged and had hemorrhagic areas throughout the muscles; the pharynx was pale in color and contained a serous infiltration.—J. L. R., Texas.

REPLY: The culture was received safely, but much shaken to pieces. It was a typical growth of streptococcus pyrogenes, and in addition, a few contaminating organisms.

The laboratory findings, together with the complex symptoms so fully described in this splendid report, inclines to the conclusion that the trouble was a streptococcic septicemia or purpura. The symptoms alone incline one more to the probability of a complication of Bacillus equisepticus, but no bipolar organisms could be found in the culture.

It would be interesting to know what medium was used for this culture. The bipolar organisms will not grow on every medium. In cases of this kind, I prefer that blood samples be sent in, or that they be sent in addition to the culture, giving me an opportunity to select different media for the different organisms in question.

The calcareous deposits were no doubt of long standing, and it is unlikely that they had any part in the animal's last illness.—C. A. Z.

CYSTITIS AND AUTOTOXEMIA OF A TROTTER

I am sending you a specimen of urine from a horse. I wish a chemical and microscopic examination.

History: The animal is an American trotter, seven years old. He was worked on a farm until about six months ago, when he was purchased by the present owner and put in training for the track. He was noticed to have highly colored urine at the time of purchase and this condition has been present ever since.

The animal stretches himself and makes a number of attempts before urinating. On the track, he goes the first quarter at 2:5, gradually growing weaker until on the fourth quarter, it takes him 2:20. After trotting a mile, he is weak, has muscular tremors in the hind quarters and the gait in the hind limbs is uncertain.

I can find no obstruction in the urethera or no stone in the bladder or ureter. The feed has consisted of timothy hay, oats and corn.

REPLY: A chemical examination of the urine revealed the following: Color, dark brown; reaction, alkaline; specific gravity, 1,037; albumin, none; sugar, none; indican, much; bile, moderate amount; blood, none; acetone, slight trace; diacetic acid, none.

Microscopic examination showed: Casts, none; cylindroids, none; red-blood corpuscles, none; pus, moderate amount; crystals, triple phosphates, Ca carbonates, Ca oxalates; mucin, moderate amount; fibrin, none; fat, none; spermatozoa, none; amorphus phosphates; squamous epithelium, many; renal epithelium, few; bacteria, many (mostly B. coli), parasites, none.

Diagnosis: Coli-cystitis and intestional fermentation.

The analysis shows symptoms of cystitis, due probably to B. coli infection. The case is therefore one of coli-cystitis. The clinical symptoms described in the letter correspond nicely with the laboratory findings. For example, the presence of many squamous epithelium (bladder epithelium and a moderate amount of pus cells, also many bacteria, mostly the B. Coli. There was an excess of indican present, which is always found in cases of intestinal fermentation.

An autogenous bacterin made from the organisms found in the urine should be very beneficial in this case. A good, thorough cleaning out of the bowels to rid the animal of intestinal fermentation is indicated.—C. A. Z.

THE USE OF FORMALIN PRECLUDES BACTERIOLOGIC EXAMINATION

Under separate cover, I have sent you a specimen of lung, liver and kidney taken from a hog. This animal was kept in a herd in good, clean, dry quarters; was fed oats, corn and barley with tankage in a self-feeder and watered by an automatic device.

The hogs seem to get a little stiff and breathe short for about twelve hours, and then die. I have been unable to find any symptoms of cholera or of swine plague. The liver of the first one I posted was honeycombed, and emitted a very disagreeable odor. These hogs had had double treatment for the prevention of cholera, and had been given swine plague bacterins.

I trust that a laboratory examination will reveal something not discovered in the autopsies.—L. L. D., Ohio.

REPLY: The speciments of lung, liver and kidney were received in formalin solution. This preserves them of course, but makes impossible a bacteriological examination, cultivation experiments or animal inoculation. When a bacteriological examination of such specimens is desired, they should be sent in powdered borax or boracic acid, each organism wrapped separately. (See an article by Dr. F. B. Hadley on the preparation of specimens for laboratory examination, published in the proceedings of the Wisconsin Veterinary Medical Association for 1920.)

Your description of the postmortem findings indicates the presence of gas-forming organisms in the liver, but this could easily be a purely postmortem contamination if the autopsy was not performed at once after the death of the animal.—C. A. Z.

LEUKEMIA IN A HEIFER

I am sending a part of the prescapular lymph-gland and a tumor from a three-year-old Holstein heifer. About three weeks ago, the owner noticed this animal lost flesh, but not enough to cause alarm, until he found it down in the pasture unable to rise. I was called and found the following conditions.

The animal was in fair condition. Temperature normal, breathing normal, pulse slightly accelerated and no symptoms of pain. When "tailed," to her feet, the hind quarters would give way under her weight, just like a horse with azoturia, except that the back was highly arched.

She lay three days without much change. On the fourth day, she insisted on lying flat on the side and on the fifth day she was killed. Postmortem findings show the duodenal wall thickened and hemorrhagic, and the other abnormal tissues of which specimens were sent you. This animal was not pregnant. She was delivered of a calf about three months ago.—S. E. B., Indiana.

REPLY: The specimens were received in good shape, nicely packed. The heart showed a typical compensatory hypertrophy and dilatation of the right ventricle. There was partial pulmonary insufficiency.

The prescapular lymph-gland appeared considerably enlarged. Sections examined microscopically proved it to be a hyperplasia with an increase of the small spheroidal cells and of the reticular tissue. Such lymph-glands are commonly found in leukemia.

I regret that a blood smear could not have been had from this animal. It would in all probability have shown a typical blood picture of leukemia. The tumor

consisted of enlarged lymph-glands and under the microscope proved to be a typical angiosarcoma.

This is a most interesting and instructive case. It is worth while to know that such cases may be diagnosed during life with a proper differential blood count and an Abderhalden test for malignant tumors. The blood count would show the leukemic condition and the possible involvement of the lymph-glands. The Abderhalden test would give the sarcoma diagnosis and the location of the tumor in a lymph-gland.

It is unfortunate that more practitioners do not take advantage of the wonderful means of diagnosis offered in the Abderhalden test. It is only necessary to draw one ounce of blood from the jugular vein in the morning before the animal has been fed and to set the blood aside and let it clot. Pour off the clear serum into a sterile tube which the laboratory will be glad to furnish on request and send it in a mailing tube, also furnished by the laboratory.

In a few days the veterinarian will have his report back and know all the facts. We shall be glad to co-operate with any practitioner to this end.—C. A. Z.

Queries and Answers

TREATMENT FOR INFLAMMATION OF HARDER'S GLANDS

A bay mare, four years old, and a black gelding, three years old, fat and in good condition were running in the pasture at the time. When the owner went out to drive them in, they would run and play as though there was nothing the matter with them, and when put in the barn, they would eat like the other animals.

They seemed normal in every way, but the eyes. The membrana nictitans was drawn upwards and backwards almost to the pupil, similar to the eye in tetanus, but there were no symptoms of tetanus. Both eyes of both animals were affected the same. There were five other older horses on the place, but their eyes were normal.

What I want to know is what is the cause of this condition and what is a successful treatment, if there is any. The eyes were clear and bright.—F. L. E., Illinois.

Reply by Dr. E. L. Quitman: We are of the opinion that the cases above described are due to some irritating material such as pollen or dust, containing perhaps some irritating mineral substance which found its way into the eyes of these two animals. The fact that the other older animals were not similarly affected does not necessarily mean anything, as the two afflicted animals may have gotten into some area of the pasture where such irritating material existed and the older horses were not so unfortunate.

We think this irritating substance set up an inflammation of Harder's glands, which are situated on the anterior surface of the membrana nictitans. The inflammation and enlargement of these glands invariably cause a protrusion of the membrana nictitans.

Treatment: Frequently, in long standing cases, these glands have to be removed, by the aid of a local anesthetic, preferably a four percent solution of cocain dissolved in a one to one thousand solution of adrenalin chlorid, this to be applied drop by drop to the mucous membrane on the anterior surface of the membrana nictitans and a small amount of it injected with a fine needle beneath the mucous membrane. This will give a painless and an almost bloodless operation.

The membrane covering Harder's gland should be picked up with an artery forceps, pulled outward and snipped close to the cartilage of the membrana nictitans with a scalpel or preferably with blunt point curved scissors.

Should you wish to try medicinal treat-

ment, I would recommend the following:

℞ Cupri sulph ..... gr. to iv
Aq. Destil. ..... ℥

M. ft. sol. et filtra.

Sig.—A few drops in the eyes three or four times daily, this to be alternated with a few drops of the 1 to 1,000 adrenalin solution. The eyes are to be protected from the light.

A SERVICEABLE WHITE LINIMENT

I have, for nine years been trying to get the formula of an embrocation (white), which *will not break down on standing*. I am anxious to get a thick (economy in use), white (appearance) embrocation, which will really fill these requirements. All I have tried so far have failed.

I should be truly grateful if any of your readers could help me out, particularly giving details for making same and indicating whether it blisters or blemishes. I mention this latter because after failures, one is usually told, "Oh, well, you couldn't have mixed it up right."—R. V., Virginia.

REPLY:

℞ Ac. Oleici (U. S. P.)..... ℥ij
Ammon. Chloridi pulv... ℥ij
Aq. ammon.
Ob. terebinth .....aa ℥jss
Aq. qs. ad. ..... Oj

In making up the above, mix the ammonia and turpentine together thoroughly, then add oleic acid and again shake thoroughly. Dissolve the ammonium chloride in a portion of water, mix with the other ingredients and shake thoroughly. Then add the remainder of the water. This should be agitated several times daily for a few days before being dispensed. A slight cream color evident on its being first mixed will, in the course of two or three days bleach out to the purest white.

The degree of viscidity, commonly referred to as the creaminess, desired, may be procured by increasing or decreasing the amount of ammonium chlorid. Thus, by increasing the amount of the ammonium chloride to a certain extent, you may produce a liniment or embrocation that will not flow freely from the bottle, but will have to be shaken out. A little experimentation on your part will produce a finished product that will comply with your personal desires.

The above formula will not blister, but will act as a stimulating application. Should you desire to blister or to use the same basic formula for the purpose of a counter irritant, this may be procured by adding more ammonia and turpentine and shaking thoroughly.—E. L. Q.

TREATMENT FOR A FACIAL FISTULA

I am fairly successful with my cases here, but have one that I would like to recount with a view of receiving a little help in the matter.

This case occurred in a four year old horse, which, for some reason or other, had the second upper molar removed by trephination, on the left side, some four months ago by another veterinarian.

It seemed to do well enough, but would not entirely heal, there being a

small area, about the size of a small shot, which kept discharging and the animal was brought to me for treatment. At first, I cauterized the small tract with a

view to causing enough inflammation to secure healing. This failed, however, and the animal was again brought to me for treatment. A small probe could be inserted into the tract and passed down into the mouth; but, at the point where it entered the mouth the hole was very small.

Thinking there might be some small piece of bone which had necrosed, and which might be causing the trouble in the wound, I explored it very carefully, and even removed a plug of fibrous tissue about three quarters of an inch in diameter, but failed to find any such condition present. I returned the animal to its owner with the hope that the wound would heal this time. Is my treatment correct, and if not, how may I treat this condition?—C. H. R., Oklahoma.

REPLY: It is our opinion that there remains somewhere in the wound tract a spicule of bone, and that the case will give you trouble until this is found and removed or until it is absorbed.

It does not necessarily have to be necrosed in order to keep up a fistulous condition. Should you not feel inclined at present to retrephine and reestablish the opening from the facial bone through into the mouth cavity, in search of such a piece of bone, we would advise that you inject the fistulous tract twice daily with dilute hydrochloric acid, U. S. P., for about ten days, after which time, inject the tract once daily for about five days with full strength tincture of iodin.—E. L. Q.

SODIUM CACODYLATE PREFERABLE TO TRYPAN BLUE IN INFECTIOUS ANEMIA

Where can I procure trypan blue. An article in the Journal in November, 1918, recommended this dye as a treatment for swamp fever in horses.—J. A. A., Wisconsin.

REPLY: A canvas of various wholesale druggists and chemical supply houses in Chicago, some of which are the largest of their kind in the United States, elicits the information that trypan blue is now entirely off the market. It was formerly imported from Germany, but under present conditions, its importation is unlawful.

In its place, we suggest that you use sodium cacodylate, and we believe that if your cases of infectious anemia are not too far advanced that you will get better results from it than from trypan blue.

Administer it to adult horses in 45 to 60 grain doses, repeated every five days. If the cases are not available oftener than once in seven days, increase your dose to one and one-half drams.

These doses should be dissolved in about one ounce of sterile water and injected subcutaneously, intramuscularly or intravenously. The first method is the easiest and is highly satisfactory.—E. L. Q.

IS THE TREATMENT OF GLANDERED HORSES PRACTICABLE?

Volumes have been written and lengthy discussions have been held relative to the causes and diagnosis of glanders, but comparatively nothing has been said about its treatment. Leaders in veterinary thought and literature all appear to have held the same view, considering it an incurable disease and advising the destruction of the afflicted animal.

About eight years ago I began to experiment with glanders; after a number of failures, I met with a measure of success and have treated altogether about fifty cases with good results. The cases I treated were those of the subacute type, some showed pulmonary symptoms, some were reactors from the ophthalmic test, with no physical evidence of the disease, and others were true cases of farcy. The last named cases were the first to respond to the treatment, all evidence passing away within two weeks, and when tested at the end of the fourth week, proved negative. The glanders cases were treated the same way but with heavier doses and the majority of them showed a marked improvement in ten days, had more energy, did not tire so easily, had a better appetite, coughed less and showed an increase in weight. Those cases that worked during the treatment were used single, where possible, and when not, the mate was given immunizing treatment which was successful, as no horse so treated developed the disease. All the cases I treated have remained free from

glanders or farcy to this time, or until they were sold and lost track of, or died from causes other than glanders.

That the cure is permanent is evident to me from the fact that the first case treated is in perfect health.

GEO. L. WARNER, D. V. S.
New York City.

COMMENT: The above is interesting. However, we must remind the writer that one reason that experimentation in the treatment of glanders has not been carried on extensively is due to the fact that every state, in fact, we believe every civilized government, prohibits the keeping or use of animals afflicted with glanders.

It is a well known fact that following the *subcutaneous* administration of mallein, even clinical cases will frequently apparently recover. These animals, however, though again returning to first class condition, may act as spreaders of the disease. A case in point: a number of years ago in Illinois, a stallion which gave a marked reaction to the subcutaneous mallein test, the only one in use at that time, subsequently apparently made a complete recovery. Further tests of this animal proved negative, and due to the pugnacity of the owner, who refused to permit this animal to be killed, he was quarantined for a period of nine years, and during this time he was kept in a pasture by himself and showed no manifestations of glanders whatsoever. Finally, he broke from the pasture and mingled with some other horses, among which the disease soon broke out. Other sources of the infection were excluded.

The fact that it is difficult to know whether an animal is cured or not, or whether he is a spreader, renders treatment in our opinion impractical, and is no doubt the cause for the laws opposing the treatment of this disease.

With regard to the treatment mentioned as a preventive, we can point to precedent that dates back many years before the advent of mallein. We refer to the old custom among American veterinarians of administering sulphate of copper to all exposed animals. This custom was handed down to us from British veterinarians. This drug seemed to act as a prophylactic against the disease. We say *seemed* because we had no mallein and it was impossible to tell whether the animal receiving the drug was infected or not. Consequently, it was impossible to draw accurate conclusions as to the actual value of this drug as a prophylactic.

It is a curious fact that except for the discovery and use of mallein as a diagnostic agent for glanders, we have learned almost nothing about this disease in a hundred years. The experiments and observations of Prof. Volpi of the Veterinary School at Milan about a hundred years ago, constitute about as accurate and intelligent a discussion of the subject as could be given today, with the exception that mallein or its use, of course, was not mentioned.

The work of Prof. Volpi was reported and commented upon and supplemented by observations of his own, by Prof. M. Barthelemy of the Veterinary School at Alfort, and by Veterinary Surgeon James White of the First Royal Dragons of the British Army, thus familiarizing the veterinarians of one hundred years ago in Italy, France and Great Britain with a conception of the disease that is up to date even now.

A few quotations from Prof. Volpi may be interesting:

HONORED BY HIS TOWNSMEN.

Dr. I. A. Anderson, who was recently elected mayor of his home town, Stanhope, Ia., thus belying the old proverb: "A prophet is never without honor, save in his own country."

"Glanders is caused only by contagion.

"The moment a horse is suspected, he should be carefully separated and it is much more commendable to exercise what may be considered an unnecessary degree of severity upon this point, than to appear deficient in the most trifling circumstances.

"Glanders is peculiar to single hoofed animals and often makes great ravages, especially in regiments of cavalry."

"The only cause capable of producing glanders is contagion.

"Farcy is a chronic cutaneous disorder, peculiar to single hoofed animals, characterized by a series of small tumors situated under the skin, joined together by a kind of cord. They are, in fact, tumorized lymphatic glands and the cord that unites them is a tumorized lymphatic vessel. This disease can be produced only by contagion."

Commenting upon this report when it was published in England, Veterinary Surgeon White states that:

"Farcy is always a symptom of glanders," and again quoting White:

"I have seen a considerable number of horses that have been cured of farcy become glandered at different periods afterward; in one case, after a period of five months, and I am therefore led to suspect that many of the supposed cures that have been published have terminated in a similar manner.

"It has been clearly proved that glanders is produced by swallowing glanderous matter either with food or water, either immediately after it has been discharged from the nose or sometime later when it has become dry and hard.

"I have met with horses so hardy as to resist glanderous poison when applied by inoculation, and others that did not become infected until they had been inoculated several times; but on young asses, its effect is quick and certain and almost always fatal in a few weeks.

"It is nearly the same when the glanderous matter is given to a young ass with some oats for several days. I have seen an old horse that was sound put in a stable with glanderous horses and worked with them for sometime without contracting the disorder. I have seen another sound horse put into the same stable and worked like the former horse, with the glandered team, and he contracted the disorder in about six weeks."

Speaking of England of a century ago, Veterinary Surgeon White says: "It is to be regretted that no law has been enacted as there has been in France, to prevent glandered horses from being worked or kept."

There are many things new in veterinary medicine, but our knowledge of glanders, its infectiousness, its method of spread, its symptoms and causes, the danger of carriers and its treatment is not among them. By the way, the recognized treatment for glanders in England a century ago, was eight to fifteen grains of corrosive sublimate daily, and in France and Italy, one-half ounce of the black sulphuret of mercury daily.—E. L. Q.

RUPTURE OF RECTUM DURING PARTURITION

A fifteen-hundred pound mare foaled on the night of the 25th. The colt was large. The mare was apparently all right on the 26th, but on the morning of the 27th, about eighteen inches of the rectum and small intestines were protruding, and hanging down outside.

Upon examination, I could not find the end of the small intestines. There was no rupture between the vagina and rectum. How did the intestine become completely severed without a rupture between the vagina and rectum?—H. R. O., Arizona.

Reply: The case described is not an enigma and is by no means a singular occurrence. Postpartum prolapse of the intestines through the rectum occurs quite frequently. Sometimes the intestines protrude without prolapse of the rectum. The anterior part of the rectal wall ruptures and small intestines or floating colon protrude through the breach. In this case the straining incident thereto forced the rectum to invaginate. The breach in the rectum was the initial injury and if carefully examined it would doubtless have been discovered, at least postmortem. In this case there seems to have been enough rectum exposed to have enabled the diagnostician to have located the damage an-

temortem. The delivery of a large fetus, and especially a dry one, is the most common cause of prolapse of the rectum in mares. It is always a grave accident and when complicated, as above stated, is always fatal.—L. A. M.

POISONING FROM MOLDY CORN FODDER

On May 19, I was called to attend a case of supposed choke in a cow. On arrival I found the cow standing in her stall apparently in the best of health, no symptoms of choke or other disease being evident. Temperature, pulse and respiration were normal.

The history was that the cow had been found in her stall in the barn, showing the following symptoms: head extended and saliva dripping from her mouth. Breathing very fast; staggering and excited. When taken out of the barn she walked as though intoxicated, staggering and trembling. She bumped her head against a post; fell down and got up, acting as though blind. After a few moments these symptoms disappeared, and she gradually became normal, walked to the trough and drank some water.

No diagnosis was made, but physic and tonic were prescribed. She had no more trouble and she is now doing fine.

On May 30th I was called to the same farm to attend another cow showing the same symptoms as the previous one. However, they were more severe and lasted longer and were repeated at fifteen-minute intervals. Learning that she had been fed moldy corn, I made a diagnosis of forage poisoning. I gave her a drench consisting of a quart of linseed oil, to which I added 1 ounce of oil of cajuput, one and one half ounces of turpentine and 1 ounce of aromatic spirits of ammonia.

Several minutes after receiving the drench, she extended her head, the pupils of her eyes becoming dilated and staring. The trembling increased gradually until it was very pronounced. She would lift first one leg and then the other; extend her head and draw it to one side; rest it against the stall and fall to the ground, becoming very rigid. There was considerable muscular twitching as in strychnin poisoning. This gradually ceased and after lying quietly a few minutes she would struggle to get up. After several attempts she would gain her feet, stagger and lean against the stall. In a few moments she would be apparently well, and would eat and ruminate normally. The attacks were repeated every ten or fifteen minutes several times, then once an hour, lessening in severity.

The second day she had several attacks but not so severe as on the first day. The third day she was out in the pasture eating with a fair appetite. She gradually lost her eyesight and her appetite diminished somewhat. Two weeks later she was found dead in her stall. The evening before she had eaten her feed, but appeared nervous. The muscular twitching never ceased entirely, and at the first she became very excitable when handled, but after the third day these symptoms were not noted.

The treatment was as follows: One-fourth grain atropin several times a day for the first three days, given subcutaneously. After the third day she was given a physic of 1 pound of epsom salt, intestinal antiseptics, i. e., sulphocarbolates compound, turpentine, creosote, oil of cajuput, soda bicarbonate, soda hyposulphite and gentian.

I have lost several horses from the same cause, and I would be glad to have some one suggest a satisfactory treatment for this condition.—J. R. R., Pa.

REPLY: The fundamental principle in the treatment of any type of forage poisoning lies in prompt, prolonged and thorough evacuation of the gastro-intestinal tract. Get this firmly fixed in your mind: To start with, we would advise the administration, in cattle as well as in horses and other animals, of one of the quick acting purgatives, preferably physostigmin sulphate. Such may, and is best purchased in hermetically sealed tubes containing one and one and one-half grains. To cattle, we would advise giving from one to one and one-half grains dissolved in about a dram of water subcutaneously, divided in three doses about twenty minutes apart. This to be followed by the administration of a liberal dose of a saline purgative.

Then administer at about four-hour periods, the following: One to two-dram

doses of permanganate of potash and about one-half ounce doses of alum sulphate, dissolved in and diluted with about one gallon of water. In those cases in which deglutition is paralyzed, it may be necessary to administer the medicaments through a stomach-tube.

Further treatment will necessarily be entirely symptomatic. Thus, some animals show delirium. In such cases antideliriants must be administered, such as iodid of potash in liberal doses, fluid extract of gelsemium, etc. Where stupor, semi-coma or coma is present, citrated caffein, or in the absence of this, one-half gallon to a gallon of strong coffee may be administered. Debility to be counteracted by stimulants, such as aromatic spirits of ammonia.

Strychnin should be used only under the utmost precautions, as many molds produce symptoms simulating those of strychnin poisoning, and in such cases where nervous excitability is a predominant features, a very small dose of strychnin may prove fatal.—E. L. Q.

HARMLESS SUBMAXILLARY EDEMA

I have seen several cattle and have a case now, where the skin under the lower jaw becomes very baggy and pendulous, the enlargement being very heavy, nonpainful, and doughy in character. When opened, a clear, saliva-like, stringy substance exudes.

The cows always seem to be in perfect health. The swelling doesn't decrease very rapidly, even after being opened. There are no other swellings on the body.

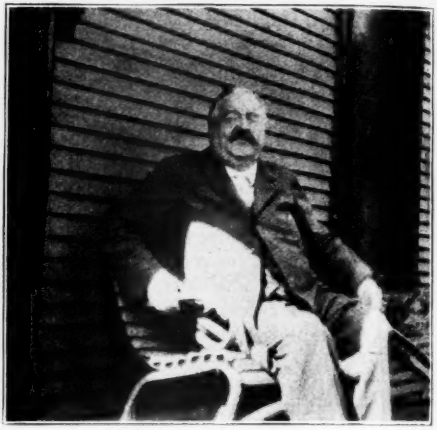
I should be very thankful if you would give me information as to cause and treatment.—F. C. M., Ohio.

REPLY: I think the condition you describe is the one seen almost always in cows that are no longer young. Your description of it is very good. I do not open these any more, as practically no benefit is derived from opening them.

Whenever a client wants such a case treated, I give him a mixture of equal parts tincture iodin, oil of turpentine and oil of cajeput, to be applied with a stiff brush once a day. From two to three weeks of such treatment reduces them satisfactorily.

I think these swellings are due to a low-grade inflammation of the sublingual and submaxillary salivary glands, which extends to and involves the surrounding connective tissue. They never seem to do any harm.

You will find the treatment I suggest to be quite satisfactory.—Mart R. Steffen.



DR. A. S. ALEXANDER.

Readers will recognize in the above the jovial, kindly countenance of Dr. Alexander. Except for ten weeks instruction in January, February and March, given to short course students in veterinary medicine, Dr. Alexander has withdrawn from the University of Wisconsin, with which he has been identified for twenty years. Except for this short course work, Dr. Alexander will devote his whole time to the work of the Stallion Registration Board. Dr. Alexander is virtually the father of all stallion registration legislation in the country. He was the first to urge it and put it in execution in Wisconsin.

The photograph was taken on the second floor porch of Dr. Alexander's home, just outside the door of the state office of the Stallion Registration Board, which he has fitted up in his home, owing to the difficulty he has in getting about, and because no pleasanter or better adapted place for the work is to be found in Madison or anywhere else.

Dr. Alexander's residence stands on the shore of Lake Monona and from his office windows and door and the porch outside, you can see across the lake to the other shore. A flight of steps leads to the boathouse and a motor boat, which will take him to the farther shore, two or three miles distant, or anywhere else on the lake.

Dr. Alexander didn't know he was being "shot" when this was snapped, but as usual, was telling Scotch stories for the entertainment of his visitors from Chicago in an accent that at times kept some of them guessing. Dr. E. L. Quitman was on his right, Dr. C. A. Zell on his left. We cut them out of the photograph because from their puzzled look, readers would think that one was trying to think up a new use for sodium cacodylate and the other performing a similar service for Flavisol.

Department of Surgery

By DR. L. A. MERILLAT

A Word About Anti-Cruelty

THERE is probably no better opportunity for the veterinary profession to endear itself to the animal-loving public and at the same time place itself on a higher plane before the world than by taking an active interest in general animal welfare. It must be confessed that we have never been ardent champions of anti-cruelty movements. On the contrary we are too often found arrayed in defense of guilty clients, always to our disadvantage and often against our better judgment.

It is incontrovertible that the brute creation deserves better treatment at the hands of man than is generally accorded it. There is sheer indifference to animal welfare in evidence almost everywhere animals are found, and besides willful neglect and brutal practices are much too prevalent. Lack of shelter, overwork, underfeeding, and filthy surroundings it will hardly be denied cause much more suffering, and suffering on a much larger scale, than the more isolated cases of out-and-out brutality. Anti-cruelty movements aim at summary punishment of the latter while the former go on unnoticed. The daily close touch of the veterinarian to these conditions places him in a position to teach the principles of sound, common-sense, practical humanity. It is a laudable enterprise both from the economical and ethical points of view. No one knows better than the veterinarian the high mortality among animals enfeebled by privation, how unsatisfactory they are to treat and how frequently they die from trivial causes.

Our cardinal responsibility is of course that of assuring our patients of as scientific treatment as modern knowledge permits, but to this we should add the duty of seeing that they are accorded as humane handling as moral ethics directs. In short, as good sports we should not only play fair with the defenseless brute but should see to it that others do the same.—L. A. M.

SURGICAL ALLUSIONS

No. 1.—In the administration of anesthetics the toxicity of the agent administered is the most significant feature of the procedure. Over-saturation—in short poisoning—is the common cause of death from inhaled anesthetics. Likewise, fatalities from local anesthetics is due to the administration of a lethal dose.

No. 2.—Fatalities from cocain, although rare, do occur in domestic animals to which this toxic agent is administered. When it does occur the accident is always a serious event because the operation for which it is given is of minor importance as such and can not be incriminated. The blame goes where it belongs—over-dosing. The careful surgeon will pay no attention to the proponents of large doses of cocain.

No. 3.—Weak solutions of cocain, properly delivered, produce a better anesthesia than concentrated solutions recklessly administered. The separation of the tissue fibers is in itself anesthetic. The solution should therefore be administered rapidly enough to "bulge" the seat of delivery.

No. 4.—No effectual substitute for cocain has yet been discovered. Substitution is, however, not discouraged because the search for a less toxic agent is desirable.

No. 5—Solutions for hypodermic delivery should be sterilized. It is futile to make an aseptic incision after injecting a septic anesthetic.

No. 6.—The harm we do in one way or other in the necessary forcible restraint of our surgical patients is legion. To properly control a surgical subject is an art that comprehends the welfare of the patient, owner and surgeon. Minimum discomfort for the patient, minimum hazard for the owner and minimum danger for the surgeon are the desiderata.

No. 7.—Senility, obesity and pregnancy are the most baneful conditions in surgical restraint. Exhaustive struggles enfeeble the patient and thus detract from the success of many operations. Badly adjusted hitches, knots and buckles cause needless pain. Slip-shod tying invites injury to patient and operator and improper positioning prevents good surgical work. (To be continued.)

SOME CONSIDERATIONS ON THE PRODUCTION OF HETEROTOPIC TEETH OF THE TEMPORAL*

Just as we are ignorant of the intimate conditions upon which evolution of normal beings depend so are we also in ignorance as to the principal factors which cause this physiological evolution to deviate so as to engender the numerous tetraological anomalies unfortunately encountered with considerable frequency. Among these attention is drawn to one frequently found in veterinary surgery, dental cyst of the temporal.

This anomaly is rare in humans and the author has never found it existent among the small animals treated in the veterinary college clinic. Since the embryonic evolution is approximately the same in all species so far as the temporal bone is concerned there appears no plausible interpretation for this variation in the susceptibility of the different animals. Among the dermoid cysts of the ovaries, testicles and other organs enclosing hairs, cartilage and sometimes teeth, this preference does not exist.

Among the theories advanced to explain the genesis of this anomaly most of them conciliate badly with the admitted facts of modern embryology. Some authors have classed them as endocymic monsters, some as follicular migrations, some as an infolding of the skin into the depth of the tissues and a resulting transformation of the infolded skin into mucous membrane, while partisans of heteroplasia claim that simple tissues as well as complex organs are capable of forming all kinds of objects in parts of the body where they should not exist.

In considering the embryological evolution of the head one finds that the cranium is constituted of two kinds of bone: 1st, cartilaginous bones which develop from a pre-existing cartilage, called *primary bones*: and 2nd, membranous or fibrous bones which derive their origin outside of the primordial skeleton of the head, in the dermis of the skin or in the buccal mucosa. These are therefore cutaneous or mucous bones and are called *secondary bones.* In lower vertebrates these two varieties remain distinct while in the higher forms they fuse together. In the second category belong the bones of the cranial arch and those of the face. Considering the evolution of the temporal bone one finds it is formed of three parts: the petrous, the tympanic and the squamous. The petrous alone, among these, belongs to the primary bones, the tympanic and squamous develop from the buccal mucous membrane, and thus belong to the second category (membranous bones). One can then understand that a dental follicle can find itself here and develop about the same as those implanted in the dental arcades.

The first symptoms escape notice and the development proceeds without causing any functional trouble. Several weeks after birth a clear, inodorous viscous discharge appears from the border of the concha coming from an orifice several centimeters above the commissure. On examination, a small orifice is found at the level of the skin at this point. The skin is invaginated and terminates in the mucous membrane which lines the tract. The fistulous tract directs its course toward a tumefaction varying in size and located two to three centimeters in front of the base of the ear. The tumefaction is hard, bosselated and often movable.

As to the orifice and the tract they are very likely the result of a non-total occlu-

*By F. Hendricks, Am. de Med. Vet., 1920, June.

sion of a branchial cleft. This explains the mucous lining of the tract wall.

Usually from the invasion of pyogenic micro-organisms through the exterior orifice the depths, previously insensible, become very painful on palpation or on adjusting the bridle. The discharge changes to muco-purulent and even fetid. The orifice often closes and an abscess of some size develops and on bursting transfers the orifice to the seat of pointing. There are different varieties dependent upon the seat of the tooth. Although usually found on the external face of the petrous it can nevertheless be located deeply sometimes related to the dura-mater. It is in these cases that nervous symptoms sometimes occur from compression of the hemisphere, and aside from the orifice at the concha there is little evidence to indicate the location of such an anomaly in the region. That is, there is no tumefaction of the region, the tooth is too deeply imbedded to show at the surface.

The prognosis depends very much upon the difficulty encountered in forming an exact idea of the tooth location. In effect, it would be fool-hardy to extract a tooth related to the brain. The dura-mater would be exposed and the hemisphere wounded. Only under the strictest asepsis would such intervention be advisable since the operation and after care would invite mortal encephalic complications. The remedy might prove worse than the disease.

The therapy is, however, purely surgical. The horse is cast and an incision is made longitudinally over the tumefaction through the skin and subcutis. The lips of the incision are widened with retractors. The tooth is then seen covered with a fibrous capsule that englobes it and which is attached to the osseous cavity in which the tooth is lodged, reminding one much of an acorn in its shell. The capsule is incised and detached from the bone with a cannulated sound. At this point one observes the movability of the tooth and the depth of its implantation. If movable a lever is introduced and by a prying movement it is lifted out. If on the contrary it is found solid a gouge and mallet will be necessary. When removed the cavity is explored for a possible second tooth for sometimes two or even three teeth may be contained in the same cavity. The cavity, to assure unimpeded cicatrization, should finally be well curretted. A probe may now be passed from the conchal orifice into the tooth cavity. This done the whole tract is laid open and its mucous lining carefully and thoroughly dissected away. The after care is the usual one for such wounds.—L. A. M.

UNCASTRATED AND LONG TAILED LAMBS

When lambs arrive on the market with long tails and uncastrated they bring a lower price than those properly "dressed." In fact such lambs are classified as culls and the producer whose indifference is thus displayed is the loser. Buyers on the large markets often insist that all such lambs be sorted out before bidding on the lot. This prejudice is not born of mere fancy as might be supposed. Entire males lose in meat quality as much in sheep as in other species and long-tailed individuals do not score well in general appearance and spoil the looks of the whole herd. Besides the tails of sheep while serving no useful purpose are harmful dirt carriers and undocked ewes do not breed so well.

With these facts as a basis the veterinarian should teach the principle of universal docking and castration of all lambs and thus assist in developing the sheep industry to its highest degree of refinement.

The cause of this omission on the part of owners is probably the high mortality that sometimes occurs among lambs from castration. Although docking is seldom in itself a cause of loss, when done at the time of castration it is often blamed as a contributing cause. The veterinarian is in a position to show that castration of lambs is no more fatal than the same operation on other species and that docking is a safe, harmless procedure. The fatality among lambs from castration is due solely to the filth-carrying character of the scrotum. If this is managed, the operation is at once deprived of its hazards. The best method is to soak the scrotal wool well with a strong solution of mercuric chlorid and then perform the operation in such a way as to prevent the stump of the cord from touching the ex-

terior while it is out for division. The blame for complications we think is the trailing of shreds of the cord over the exterior and then withdrawing into the scrotal cavity. By keeping the scrotum securely fixed in the left hand as the testicles are drawn out the proximal shreds draw back without being soiled. Then it is always well in sheep to dust the interior of the sac with a good strong antiseptic powder. Iodoform is the best for this purpose. In the interest of economy it may be diluted with powdered boracic acid.—L. A. M.

IODIN AS A DISINFECTANT

In a series of investigations reported in the *Acta Chirurgica Scandinavica*, 1920, Vol, III, No. 3, Dr. Johan Seedorf shows that our prevailing impression as to the efficiency of iodin disinfection is at least in part fallacious. The tests were made both in vitro and in vivo. In vitro he found that a one per cent aqueous solution in potassium iodid kills staphylococci in one minute but tetanus spores resist for two hours. The efficiency increases with the strength of the solution but reaches its maximum effect in a one per cent solution.

As was usually supposed moisture on the skin did not inhibit its action, as it was found as effective after washing and before the skin had become dry in a series of experiments on rats' tails. Dryness therefore is not essential in order to obtain the best results.

Sections of skin taken from humans, after having been prepared in the manner practiced in three different surgical wards, were found to be sterile only in 42 per cent of the tests. Primary union was however obtained in ninety per cent.

Despite these adverse findings iodin disinfection is nevertheless recommended. The best results were obtained by first mechanically cleansing the skin and then submitting the field to three paintings at ten-minute intervals during the last half hour preceding the operation.—L. A. M.

A DANGEROUS PRACTICE WHICH SHOULD NOT BE SANCTIONED

Do you recommend the introduction of oil or soapy water through a canula into the large bowel for impaction in horses? —J. L. S., Can.

REPLY: The direct delivery of liquids into the intestinal tract through a canula is a dangerous practice and should never be sanctioned. The reason that veterinarians can evacuate gases with such recklessness and without much danger is that the bowel is punctured when in a state of extreme distention. When the gas has been evacuated the perforation closes against any flow of intestinal contents into the peritoneal cavity. This does not occur

EQUINE OPERATING TABLE.

The equine operating table is an important adjunct to the veterinary hospital, facilitating the work greatly and adding much to the comfort and safety of the operator, as well as impressing the layman favorably.

when, in cases of impaction, the perforation is made through a bowel wall that is not stretched. A hole the size of the canula supervenes the withdrawal of the canula and allows the liquid contents to flow out. The amount of liquid ingesta that flows through such a perforation is sometimes considerable, and of course serious inflammatory complications result. If the colon be tympanitic as well as impacted the result would be less serious. —L. A. M.

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

Seventy-Five Cents A Hundred for Administrating Serum Not Grafting

I think that a blanket charge of 2c a cc. for serum and virus used with no mileage and no vaccination fee, taking the herds as they come, small and large, wherever they are and making no charge for unused parts of bottles, is not grafting in the matter of vaccination charges where the serum and virus costs 1¼c per cc.

This plan enables the man with the small bunch to get his pigs vaccinated at the same price as the man with the large herd, and the man with the large herd pays the profit, if any is realized. This is the way human surgeons make their charges. They aim to collect from the big man. He is the fellow who makes us wait for our money, and the more hogs he owns and the more money he has, the meaner he is about spending it. It isn't the little guy that kicks, it is the big one who is able to pay.

If there is any graft in the vaccination business at the present time, it is in the dosage. The present dosage is either uselessly large, or serum has deteriorated from that that was formerly made. Twenty cc. of serum and one cc. of virus for pigs weighing less than fifty pounds formerly protected them from cholera. It should do so yet. Getting back to the old dosage would reduce the cost to the hog raiser considerably.

GLEN M. SMITH.

Pittsfield, Ill.

Comment: That the prices you have named are low enough, there can be no doubt. That ¾c a cc. for administering serum to a small herd a considerable distance from the office, with no charge for mileage and no vaccination fee, is not enough, is equally true. As to the advisability or justice of forcing the owner of the large herd to pay a portion of the cost of vaccinating the small herds in the interest of the swine industry of the community in general, considerable may be said on both sides. The blanket charge seems to have disadvantages in some localities that are not offset by advantages. For example, where there are two veterinarians in the same town, one paying let us say, $1.35 for serum and the other 90c. If each charges ¾c for administering it,

one veterinarian's price would be $2.10 and the other's price, $1.65, and unless the farmers knew the cost of the serum in each case, and in many cases they wouldn't know, where the blanket method of charging was employed, the veterinarian charging the higher price would be at a disadvantage. If both made the same blanket charge, the one using the higher priced serum would be at a disadvantage, in that he could not afford to render the same amount of service that the other could afford to do, nor to carry his accounts so long.

The blanket-charge method for vaccination has worked fairly and splendidly in countless instances, but it has this primary weakness that it gives an opportunity for evil-minded persons or those who are of a suspicious nature, to assume that something is covered up in the bill, and that is just what some of them are assuming and claiming at the present time. Unusual conditions must be met by unusual methods. The easiest way of passing the present crisis is to lay all the cards on the table, face up. The illustration cited from medical practice is not a parallel case. There is an economic feature that enters into the practice of veterinary medicine that does not obtain in the practice of human medicine.

In small-animal practice sentiment may rule and economic features almost vanish. The time was when the horse was king, when the high class road and carriage horses were common and sentiment and not economic features governed some veterinary practice. But, such is not the case in the ordinary veterinary practice of today. There is no sentiment about the raising of ordinary swine and little about the maintenance of a dairy. Hogs are fed for profit and cows are milked for the same reason.

At the very foundation and governing practice among the food-producing animals throughout is the economic feature. The swine-raiser or the dairyman employs a veterinarian because he believes it will be profitable for him to do so, just as he buys tankage or cotton-seed meal because he believes it will be profitable.

The same conditions do not obtain in the practice of human medicine. There sentiment enters and largely controls, and to that extent, business principles may be disregarded. The work of lawyers, of artists and of course, of clergymen, is largely bound up with sentiment, but such is not the case with veterinary practitioners at present, nor can it ever be again. Veterinarians are employed to make a profit for their employers and not to save life or restore health, or shield a reputation, or gratify a vanity, or heal a broken heart, or soothe a conscience.

Back of every professional call a veterinarian makes, is an economic cause. Every charge he makes must conform to economic laws or he cannot attain nor maintain the success that should be his in practice. It is nothing less than folly for the veterinarian of today to attempt to conduct his practice by the same rules as have been laid down for the practice of human medicine. His problem is not the same.

Nothing could have been more fatuitous as an argument against itemizing charges for serum and professional services separately, than the illustrations from other lines of work that have been cited by those opposed to this plan. Let us keep our attention on the actual condition, not on some alleged parallel which is in fact no parallel, nor on some hothouse theory incubated for the occasion.

CAREFUL THERAPY SUCCEEDS IN SEVERE ATTACK OF AZOTURIA

Perhaps some of you readers may be interested in a rather unusual case of azoturia which I was called to treat.

The animal was a four-year-old, dapple gray, Percheron, gelding, weighing 1,750 pounds.

The horse was taken sick about noon the third of June. On my arrival, the owner stated he had driven the horse about three miles, being under the impression that the horse was merely lame in its front feet. After a time, the lameness shifted to the hind quarters. When the animal urinated, the owner perceived that it was a case of azoturia. He immediately put the horse in a neighboring barn, where it fell to the floor in a heap.

I saw the horse an hour and a half after it had fallen and observed the following conditions. Pulse 72, respiration 28, tem-

perature 103° F. The animal was not delirious. The owner said the animal had just passed a considerable amount of coffee-colored urine.

This animal remained down for seven days, making the usual ineffectual struggles to rise, but was at no time delirious. There were many passages of coffee-colored urine, but at no time was it necessary to pass the catheter. The animal was placed in slings for three-quarters of an hour on the seventh day. The following day, the animal suffered from exhaustion and indigestion, considerable bloating being present. Respiration 70, pulse 84, temperature 103° F.

This condition responded to treatment. The ninth day, the horse was placed in slings for two hours. The tenth, eleventh, twelfth and thirteenth days the animal remained on its feet by the aid of slings. On the fourteenth day, the animal was exhausted from standing. Pulse 90, respiration 60, temperature 101.8°. He was forced to lie down. The pulse dropped to 68 in one hour's time. Respiration was nearly normal.

Beginning with the fifteenth day, there was a steady improvement. The animal stood without support. On the twenty-fourth day, the animal was able to walk home, a distance of one and one-half miles. On the twenty-seventh day, I saw the patient and found the pulse 40, temperature 101° F. Several large decubital sores on the body were healing favorably.

TREATMENT: Daily hypodermic injections of lobelin sulphate, one-tenth grain, were given the first seven days. One-ounce doses of sodium nitrate were given in capsules for the first three days, then one-half ounce for the next four days. Supplementary to sodium nitrate, I gave ammoform 30 grains, oxalic acid four grains, diluted in one quart of water, as a diuretic and urinary antiseptic. This was given every hour until eight doses were given, then every three hours for five days. Gastric disturbances were controlled by 30-grain doses of salicylic acid twice daily while the animal was down. The indigestion coming on the eighth day was controlled by sodium hyposulphite and chlorocamph anodyne. Tablespoonful doses of Carlsbad salts were given three times daily in bran mashes for ten days. As an initial cathartic, the first day, I gave one tablet composed of:

Aloin	65 grains
Calomel	28 grains
Barium Chlorid	20 grains
Oleorisin Ginger	3½ min.
Strychnin Sulp.	⅜ grain.

Hot oat packs were kept on the gluteal muscles for the first seventy-two hours.

On the twenty-fourth day, I administered subcutaneously, 50 mils of antistreptococci serum and 45 grains sodium cacodylate. White lotion followed by dusting powder was applied to the decubital sores.

Sherman, N. Y. F. C. SMITH.

EXTENSIVE SWELLING FOLLOWS WOUND OF CHEST WALL

The patient, a mule, accidentally came in contact with a projecting piece of board which penetrated the pectoral muscles for about four inches. Bleeding after removal of the stick had been trifling, so I was not called at the time.

Two days later, the owner became alarmed at the enormous swelling of the neck, shoulder and sternal region extending to the floor of the abdomen, and the accompanying emphysematous condition of the parts as well as the lameness.

Probing with a disinfected finger failed to disclose any portion of stick remaining in the wound, an eight-inch seton needle with sublimated gauze was inserted to provide drainage, and lukewarm two per cent creolinated solutions were used to irrigate the wound three times daily. Warm fomentations were applied to the shoulder, and with massage of the parts, healing was complete in eighteen days.

ERNEST F. JARDINE, B. V. Sc.
Basseture, St. Kitts, B. W. I.

OPERATION SUCCESSFUL IN PYOMETRA IN BITCH

I have rather an interesting case to report of a terrier bitch, seven years old and a maiden, which was brought to the hospital for treatment for chronic eczema of the perineum, anus, and inferior surface of the tail and vulva. Close examination showed that she was suffering from pyometra accompanied by an acrid discharge. As the condition had been present for some months and the animal's general health was not satisfactory, I advised operation, which was consented to. The uterus and ovaries (cystic) were removed and the patient is making a nice recovery,

the abdominal wound having healed by first intention, and the eczema is clearing up without treatment, which affords food for thought.

When I first saw the animal, the uterus was much distended, but just prior to the operation, it emptied itself, only a little blood-stained pus remaining in the far extremities of the horns; the walls, however, were much thickened and covered with small vesicles.

I was unable to make a bacteriological examination, but judging from a number of cases I saw at the Royal Veterinary College clinic, it was a case of Bacillus coli infection. According to the College statistics, these cases of pymetra in maiden bitches are either Bacillus coli or streptococcic infection, the thickened walls and vesicle formation being typical of the former.

C. G. SAUNDERS.

West Worthing, Sussex, England.

BILIARY CALCULI AND HEPATITIS

A fourteen-year old horse that had always been healthy, was noted to be lagging in the work one afternoon. He refused to eat that night and appeared stupid the next day. At noon the second day, when I was called, the animal appeared partially paralyzed. Pulse 60, temperature 104°.

When I saw him again the following day, his temperature had dropped to 102°, and he appeared better in every way. Two days later, or the fifth day following the one on which the attack occurred, the animal was much worse. He could not be induced to walk forward at all, but could be backed somewhat. He kept all his feet on the ground, a classic symptom of hepatitis, but no positive diagnosis was made.

Throughout his illness, the horse would drink, but he would eat nothing but grass and that only during the period of improvement on the third and fourth day of the attack.

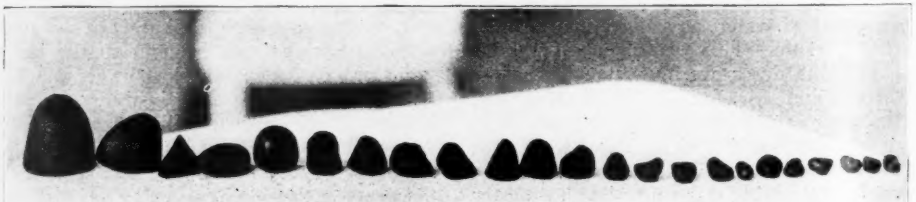
Postmortem examination showed hemorrhagic areas in the mesentery, a large abscess in the liver, and the twenty-four calculi shown in the above illustration, ranging in size from that of a walnut to that of a hazel nut.

Farmer City, Ill. A. W. SMITH.

ELEVATING THE VETERINARIAN

Consult almost any man who has practiced veterinary medicine and surgery for any length of time, and he is likely to tell you that it is a hard life if it is well followed. Indeed, that is true, but if we do not enjoy the business we should not be in it. A good many of us are apt to think that we have the hardest job on earth, but we need only to look around us to see someone with whom we would not trade places.

I think too many of us fail to impress our clients with our worth as professional men. We go about our work in a hurry, and slight it a good many times—I am speaking from personal experience. We should be more willing to earn our money. We should think more of our clients and endeavor to give them their money's worth. Many times, it is not possible to do much, but we should show our clients that we are there to help if it be in our power.



Twenty-four biliary calculi found on postmortem examination of a fourteen-year-old horse. The calculi ranged in size from that of a walnut to a hazel nut.

If we would have the public look on us as professional men, we should conduct ourselves as professional men. When we are making calls we should wear good clothes, but when we get to our destination at the farm, or wherever it may be, we should get into our overalls and go at our work as if we meant business. Nothing makes a better impression on a client than a clean medicine case and a well kept surgical bag, in which things are so arranged that you can at once put your hand on anything you need.

Many times, we are called when we are not in the mood for going, say at night. At such times we are likely to get a little cross and say things and, also think many things we do not say, and wish we were in some other business That is all foolishness. It doesn't get us anywhere and the horse or cow, as the case may be, can't help being sick. It is a good thing to get this feeling worn off and get into a good humor before we reach our destination.

When people call a doctor they think it is just as easy for him to come as it is for him to eat when he is hungry; nevertheless we should go and go in good humor, and we should never, when treating an animal, become angry and strike it, even if it seems to need it. And, if we must swear, let us wait until we are on our way home. It will have just as much effect on the patient, and the average client will not object to the waiting.

The man who loves animals takes pleasure in relieving their suffering and finds the study of his patients very interesting, as is also the study of his clients. There are no two clients alike. They must all be handled differently. The client many times is as troublesome to handle as the patient.

We should keep in good company and take an interest in all movements that are for the betterment of the community at large.

One thing that I am ashamed of is my office, and while I have been in quite a few veterinarians' offices, with a few exceptions they are like my own, hardly decent. I think we could do better in a good many ways if we would. I keep thinking I will do better, but thinking doesn't get me anywhere.

If there is any place more than another where we should use good technic and be cleanly and take plenty of time, it is in our vaccinating work. If we go out with dirty instruments, rusty needles, and dirty towels and do our work just anyway to get by and get the money, we cannot blame the farmer for wanting to do his own vaccinating. But, if we take the necessary sanitary precautions and do our work as it should be done, I don't believe there is one farmer in fifty that will think he is capable of doing this work.

Washington, Ind. OMER FLEENOR.

COCKLEBUR POISONING IN SWINE

On May 14th, 1919, just before dark, I received a call to visit some very sick pigs. I finished posting two by the light of a lantern. Postmortem lesions revealed nothing of note.

I returned the next morning and found four more dead pigs and two affected. Nothing of diagnostic value was revealed on posting. These pigs weighed about sixty pounds.

When first affected, the pigs would reel and turn in circles, and in three hours they were dead. Many cockleburs were just coming up in the field where these pigs were kept, the first two leaves only being present.

DIAGNOSIS: Cocklebur poisoning. Two and one-half grains aloin and calomel were given to each pig, and instructions given to remove the pigs at once from the field. The results were very satisfactory.

This is not a common disease in this part of Indiana, but it is seen once in a while.

P. F. SCOTT, D.V.M.

New Market, Ind.

COMMENT: Cocklebur poisoning in swine is reported rather commonly. However, many of the cases are not well authenticated. These weeds appear to be poisonous to swine only when the plants are very young, or else the animals do not eat them when they are older, since there are no well authenticated cases of poisoning from cocklebur from plants that have reached a height of a few inches.

Some have thought that it was the first two leaves, or rather the cotyledons, since these are not true leaves that contain the poisonous principle. Others have apparently shown that death is due not to a poison but to mechanical injury resulting from the

hulls of the burs, since at this stage the hulls of the burs are yet intact and lying on the top of the ground and are often pulled up and eaten with the young weed.

You state that you found nothing to indicate poisoning of any kind. We should be interested to know if you opened the stomach and if so, if the cockleburs, that is the old dried hulls of the burs, were found therein.

THE MECHANISM OF IMMUNIZATION

The author states his belief that the fat-splitting enzym "plays an important rôle in treatment by autogenous vaccines whether injected into the tissues or intravenously. Vaccines and antitoxic sera in vitro increase the fat-splitting properties of pancreatic extracts in varying degree. Their action in this direction is less than that of serum, and their antitryptic power is small or absent. In the process of sterilization by heat the bacterial enzyms are destroyed, but even 100° C. is not destructive to the thermostable activating material which they contain. From this point of view part of the value of the vaccine must be due to this material, and its power to increase fat-splitting is a factor in its protective mechanism." Experimental evidence is given in support of this theory.—J. A. SHAW-MACKENZIE, *Lancet, London, 1919, II, No. 19, pp. 825-827.*

INTRAVENOUS USE OF ERGOT IN CONTROLLING HEMORRHAGE*

In all forms of hemorrhage in which no direct local application can be made, ergot is today probably the most generally used remedy; and even when local application may be made, ergot may often be administered internally as an adjucant to the local styptic.

According to Butler, no changes in the composition of the blood have been noted when this drug has been used.

It is doubtful if any drug in our materia medica has been more carefully studied than ergot, and there has perhaps been more confusion and more contradiction in the literature dealing with the pharmacy and pharmacology of ergot than of any other drug of major importance.

The chemist endeavors to discover the active principle of ergot and he selects some element which he denominates "it". The pharmaceutist standardizes a solution with the aid of a cock and declares the result to be "it" and the balance worse than useless.

The orthodox methods of administering ergot are per ovum, per rectum, vaginally and hypodermically.

In two cases of recent date, I have had an opportunity to demonstrate its practical use intravenously without disastrous effect, and recommend it to you for further trial and report.

Case No. 1. A saddle pony, weighing about 1,000 pounds. I visited this case in company with Dr. W. H. Welch. We found the animal down and in a state of collapse, bleeding freely from the left nostril, and when turned, bleeding from the right. The animal had an anxious countenance. Death was an imminent conclusion, and we decided upon the intravenous injection of the fluid extract of ergot in preference to the slower and more difficult procedures. One-half ounce of the fluid extract was injected by means of a hog cholera syringe. The hemorrhage decreased and ceased completely within two minutes. After a period of rest, after several attempts, the animal was assisted to her feet. She was blanketed, and given warm water. For a period of two weeks, she progressed nicely, and the owner, feeling that she had completely recovered, allowed her to be ridden several miles. A second hemorrhage followed, apparently not so severe as the first, but resulted in her death, a few days later. The vision of this mare was impaired for two or three days following the first hemorrhage.

Case No. 2. A heavy dray horse, weighing about 1,700 pounds, bleeding freely from both nostrils, but not in a serious condition. I injected 20 c.c. of Merck's ergotin (aqueous solution) with apparently most satisfactory results and with no indication of any irritation or other untoward results.

I appreciate the fact that in many of these cases hemorrhage ceases spontaneously, and that two case reports do not establish the entire safety and reliability of the intravenous method, but to those using ergot as a hemostatic, I suggest its use intravenously, as offering a method log-

*Read at the meeting of the Illinois Veterinary Medical Association, Champaign, July, 1920.

ically more rapid in its action than by hypodermic or oral administration.

When the blood pressure has not been lowered, as in severe hemorrhage, but in contra as in cerebral congestion with its attending mania, I would suggest a much smaller dosage.

G. R. BROWN.

Chicago, Ill.

HYDROTHERAPY FOR IMPACTION IN COWS*

Veterinary literature, so far as I have been able to trace, seems to be devoid of mechanical treatment for the alleviation of impaction of the manyplies in cattle. A case of a cow suffering from this condition was called to my attention, with a very meager history as to how the cause had operated or what class of feed was responsible for the stasis. I administered a purgative and instructed the owner to feed soft feed and provide plenty of water. He was very painstaking in this respect, but the cow refused to take soft food and drank very little of the water offered. I had also ordered the manger to be cleaned out so that she would have no access to fibrous food. In spite of this, her condition remained stationary.

The owner came to me a few days later and told me of her condition and of her refusal to drink. I concluded that water was absolutely necessary to the successful outcome of the case, and accordingly I proceeded to the farm. By means of the stomach tube and pump I placed the entire contents of a small tub of water at a temperature of about 100 degrees in her stomach. The next day the peristaltic movement began to assert itself, and in the language of the farmer, his cow had been converted into a veritable cement-mixing machine.

Improvement was manifested and continued until a few days later when recovery was complete. Some time later the owner discovered that the ingestion of flax straw was the cause of the impaction. The conclusion I drew from this case was that if tepid water in abundance would move an impaction resulting from the ingestion of a substance of the consistency of flax straw, it should readily move impactions resulting from foods that frequently are the causative agent in impaction of this division of the stomach. Tepid water is inexpensive and is surely worthy of first place in the treatment of such a condition.

It seems to me that the effectiveness of the water might be further enhanced by adding a pound of magnesium sulphate in the last of the water in some cases, or probably the same effect would obtain if water alone were employed at intervals of twenty-four hours. This fractional administration is not always practical for a veterinarian, so that when he feels a lack of confidence in the ability of the water alone to correct any particular case he could have recourse to the addition of magnesium sulphate, or a small amount of sodium chlorid, which is easily procured, may give the patient the necessary desire for more water which will accomplish the object sought.

W. A. HARRON.

Beulah, Man.

*Read before the Veterinary Association of Manitoba, February 17, 1920.

MAMMITIS OR MASTITIS YIELDS TO BACTERIN TREATMENT

When I am called to treat a cow suffering from this ailment, I at once administer a No. 10 capsule filled with formalin solution. Then I administer subcutaneously four or five mils of polyvalent bacterins. The two-mil dose is insufficient. I order the affected quarter of the udder bathed with hot water for ten or fifteen minutes, then massage in some good mastitis ointment. I have this bathing and ointment repeated three times a day, for three or four days, as conditions require. I also dispense two ounces of formalin with directions—one tablespoonful in quart of water as a drench, three times a day.

Three days after the first visit, I return and administer five mils of polyvalent bacterins subcutaneously. One pound of salts is also indicated, dissolved in a gallon of warm water as a drench. This formalin treatment will probably seem radical to some readers, but it produces results, and that is what our clients are looking for when they are paying the bill, and it is not harmful to the digestive organs.

W. R. MORGAN.

Eminence, Ky.

A Six-and-one-half Ounce Salivary Calculus

The illustration shows a salivary calculus and the subject from which it was obtained. The condition seems to be rare.

Cow from which the salivary calculus was removed.

The calculus was taken from an aged horse and had the weight and appearance of flint, weighing six and one half ounces. It was taken out in three pieces as shown in the picture, the facets being polished smooth from long wear.

Salivary calculus removed from cow.

Leland, Miss E. H. BERRY, D.V.M.

ANIMAL TUBERCULOSIS

Tuberculosis in live stock is a preventable disease, and there is no reasonable excuse why it should exist. It should be eradicated for economic reasons. It should be eradicated to remedy a constant source of danger to mankind and directly, as well as indirectly, reduce tuberculosis in the human family. It is a fact not to be disputed that a large per cent of tuberculosis among children is caused by the consumption of milk from the tuberculous cow. It is a further recognized fact that the bovine type of bacillus is chiefly concerned with bone and joint tuberculosis of children. No man has a moral right, and should not have a legal right, to feed his or any other children milk from a cow that has not passed a most rigid tuberculin test. You as veterinarians, occupy a very important place in this campaign against this plague. The campaign against this disease in live stock is in its infancy. By the interest manifested thus far success is bound to be achieved. However, in order that this campaign may be accredited with the success to which it is entitled it will require the co-operation of every one interested in the live stock industry. In this endeavor great responsibility rests upon you, as veterinarians. It is to our profession that the general public is looking for relief in the control and eradication of tuberculosis in live stock.

J. J. LINTNER,

Chicago, Illinois.

WHY STUDENTS SELECT A CERTAIN SCHOOL

It has been my experience that a school or a university has only to raise its standard to a high level to secure a sure increase in the number of those seeking to enter. The best want the best, and the increase in those entering for a long degree course in veterinary science of the University is very remarkable. It satisfies me that the University is pursuing a right path and is rendering a national service.—Dr. George Adami of the University of Liverpool in the London *Times*.

CROWDING CAUSES LAMBING TROUBLES

A very fruitful cause of lambing trouble in ewes is constant crowding and jumping over door sills to get into the feed lots. The owner of sheep, and particularly of pregnant ewes, will do well to watch this important feature. A wide door opening out on the ground is advocated.—E. T. B.